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INTRODUCTION OF LEPROSY INTO LOUISIANA, AND THE FIRST LEPER HOSPITALS*

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NEW ORLEANS

Henry W. Blanc[1], the first dermatologist to the Charity Hospital at New Orleans, (1886-1889) and Isadore Dyer,[2] who succeeded him and later became Dean of Tulane University, each an authority on leprosy, repeated and committed to print a rumor they had often heard; viz., "that leprosy was introduced into Louisiana by the Acadians." (French people that England had expelled from Nova Scotia and who now make up fully 200,000 of the state's population). By doing so, they have made gossip appear as truth. There was no evidence to confirm these rumors and justify the assertion of these two eminent men, except that at their time a greater number of lepers were, or claimed to be, Acadians, or had lived in the Parishes of Louisiana inhabited by the Acadians. These men did not realize that certain people coming direct from France claimed to be Acadians, and were not those who had gone to Nova Scotia, a hundred and more years before.

Authors of periodicals[3], novels[4], and encyclopedias[5] repeated what these two men had to say concerning the introduction of leprosy, but without fully analyzing the writings of either. In fact, both Blanc and Dyer prove by their own writings that they did not believe the Acadians brought it, so on the face of it, lack of testimony and evidence, it proves conclusively that the Acadians were not responsible for its introduction.

The history of the Colony[6] and the knowledge we have concerning leprosy readily disprove the "on dits."

The first Acadians[7] arrived in Louisiana in 1758, and seven years later the disease was so prevalent among the people of the City, white and black alike, that it was found necessary to establish a lazaretto. If these Acadian people infected New Orleans, its contagiousness must have been great and not in keeping with the knowledge had on the subject (leprosy, a disease with a long period of incubation and not very contagious). For the Acadians on arrival did not remain in New Orleans, but made their way up the Mississippi to Bayou Plaquemine where they established a settlement in the Districts of the Opelousas and Attakapas. The disease was not known to be prevalent among them, nor did they travel through a country where it was known to exist. Although it is true that they had been confined to jails in the different states and some died of smallpox and other infections, and that their children had been bound out, still there was no leprosy in these states for them to acquire and propagate.

Other contingents of Acadians arrived at later dates and in greater numbers, coming by way of San Domingo where leprosy was prevalent, but, long before the arrival of these later contingents, leprosy was known to exist in Louisiana. Moreover, for many years ships had been conveying passengers other than the Acadians from San Domingo.

Eighty years after the Acadians had been dispersed from Nova Scotia by Lawrence, leprosy did make its appearance in the land of their debarkation[8] and some would lend undue em-

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phasis to this coincidence in order to show that the Acadians had brought leprosy to Louisiana.

Leprosy in Louisiana unquestionably dates to a period earlier than the year 1758. The early history of the Colony contributes other important factors more tangible than that of the Acadians bringing it that should not be ignored by the students who seek to find the origin of this disease in our state.

Negro slaves[9] from African pestholes had been brought into the state years before the Acadians came to Louisiana, yet forgotten as a factor. The trade carried on with our Spanish neighbors where leprosy was prevalent was, early in the Colony's history, very extensive, but ignored. Bienville, the Governor of Louisiana, had this to say in his communication to the King of France as regards his soldiers: "beg the King to discontinue shipments of chronic and incurable individuals." Some of these may have been lepers, and further it is well known that the notorious John Law carried on a lucrative business, shipping some undesirables of Europe to our Colony, and definitely, some were lepers. Either is a far more satisfactory explanation for leprosy introduction, than that of the Acadians.

Romains, in his "History of East and West Florida" says "that the chronic disease of the negro was leprosy." Negro slaves began to arrive in Louisiana in 1717, forty years before the Acadians. They came from the Congo, Angola and Guinea, and a hundred or more years before had infected , it is believed, not proved however, the West Indian Islands and both Central and South America.

That the negro contributed to its introduction into Louisiana is unquestioned; in Cartegna, in New Granada, 200 years before he was thought to be the factor in developing a pesthole. Yet 700,000 negroes coming from the same places in Africa to Jamaica, all within a few years, did not produce any unusual number of lepers on that island; and how are we to explain the fact that leprosy was not conveyed into the other states of the Union where the negro traffic was carried on in equal proportion to that of Louisiana.

The health officers may have been more exacting in these other Colonies. In Louisiana we know they were neglectful.

In early French Colonial days, the health[11] officers of Louisiana were permitted to purchase sick slaves, administer medical care and sell them as soon as health was restored. The remedies were most effective. Even the sick slaves were valuable, and lack of conscience would permit him to pass on such individuals whom he might otherwise consider incurable.

The sick slaves that had been brought to the other states and refused entrance by the health officers may have been landed on the Lafourche, Terrebonne and Islands of Louisiana, just as the bootlegger of today in his traffic, finds on the coastline an opportunity for

Father Boglioli, the Father Damien of Louisiana

ready disposal; all this is much easier than to return them to their place of debarkation. These two factors, the neglect of the health officers and smuggling, may have accounted for infection in particular sections, but in New Orleans and other sections, the white man suffered with the affliction in equal if not greater proportion than the negro. Why should this be?

During the Medieval period of history,

leprosy exacted an enormous toll on the Continent of Europe. It may not have been leprosy but some other type of disease; however, most chronic, requiring some nineteen thousand[12] lazarettos to be established throughout that country. France alone had two thousand.

At the close of the seventeenth century, the disease had practically disappeared from the Continent, remaining however in a few localities. Its disappearance from Europe was followed by a widespread distribution in the new Colonies and on the Islands of Oceanica. Is this simply a coincidence? Today the leper absconds and insists on right for freedom. Were colonial period days different from our days?

To the south of us the disease was known in very early times. Diaz narrates that Cortez opened a hospital for sick soldiers less than fifty years after the discovery of America, many of whom were lepers; this before negroes had been brought to Hispanola. Even at that time, he says, they had already infected the American Indian with leprosy.

Although this paper treats of the introduction of the disease into Louisiana and not into those countries south of us, yet I am willing to infer that Europe sent or permitted her lepers to immigrate without restriction to her new possessions. Spain permitted them to go to the countries south of us, and France to Louisiana. Students making study in research will find the topic timely. What England did with hers can uncover a most interesting document.

Gayarre, in his "History of Louisiana" says "when reading the despatches of the governors of Louisiana for a series of fifty-four years, one is tempted to believe that the French government selected from the convicts in the King's Jail, the men sent as soldiers to Louisiana." Bienville, the Governor of the Colony, complains of having under his command these specimens of humanity.

Even Dr. Blanc who would have the Acadians introducing leprosy into Louisiana has this to say as late as 1886: "a number of immigrants have brought from Western Europe developed or undeveloped forms of leprosy inherited from parents suffering from the same disease." Doctor Dyer is of the opinion "that the evidence seems to point to the fact that the disease came rather through the West Indies." Unfortunately both emphasized too greatly the Acadian story.

Leprosy had not been eradicated from Europe in the early days of colonization, and when the notorious John Law collected his cargo of outlaws and undesirables, he included the leper. The female criminal branded with the fleur-de-lys, and bound with chains to the brigands of Saint Germaine, was forced to immigrate to the new colonies. It is not unreasonable to assert that he shipped the leper. Some of those that came may have laid claim to be Acadians. They spoke French. The history of the Colony should reveal that some were from houses of nobility.

I feel that I have corrected the error of Dyer and Blanc and have established the source of its introduction. Dyer was without doubt the leper's champion, a noble man fighting for them. He would not have done

Dr. Isadore Dyer, the Champion of the Nation's Lepers.

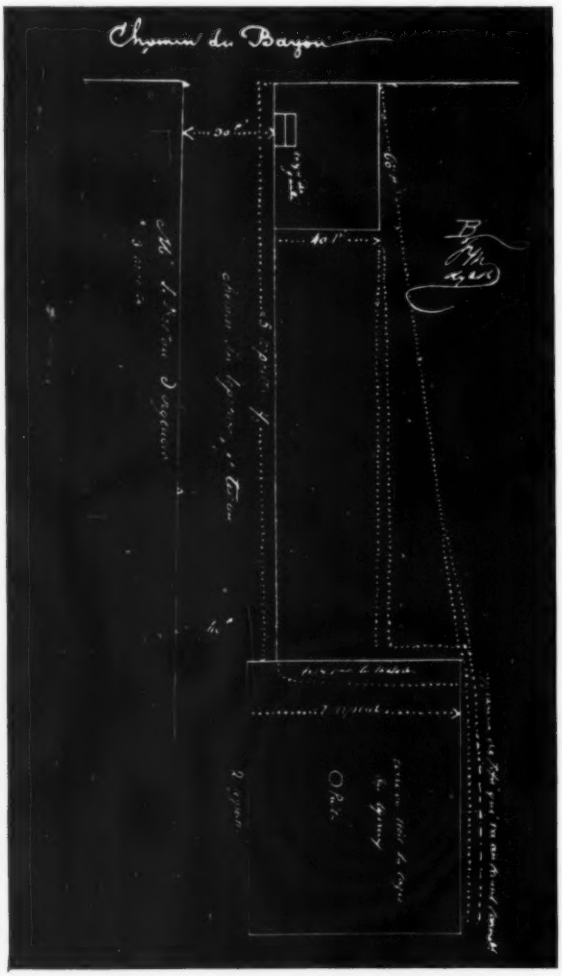
anyone an injustice. He was mistaken in this incident. Your attention is called to Dyer's works as regards the leper and our neglect to recognize what he has done.

LAZAR HOUSES IN LOUISIANA

Ulloa, the first of the Spanish governors of Louisiana, on arrival at New Orleans in 1776, commented upon what he thought to be a strange situation, the prevalence of leprosy in the city of the new Colony at a time when there were so few cases seen on the streets in Europe. He infers that he had seen many cases at an earlier period.

Without delay he immediately established a lazaretto for these unfortunates. It was located at the Balize, a settlement of a thousand people down the river, a distance of about eighty miles. In having done this, he met with criticism, for some of the afflicted had lived in the Colony for years, and even held positions of importance. In the face of this opposition, Ulloa remained firm.

Isolation had accomplished so much in banishing leprosy from the old world, that he felt convinced that it was a necessity in this new Colony. It was a mistake however to establish the San Lazaro at such a great distance from the city. He probably reasoned that the Balize was the jumping off point for the traffic coming from the West Indies, Mexico, and South America, and that it constituted the most suitable place for quarantine. During that year forty vessels came from San Domingo. Some time later a hurricane destroyed the laza-



Map of the Leper Land (1785).

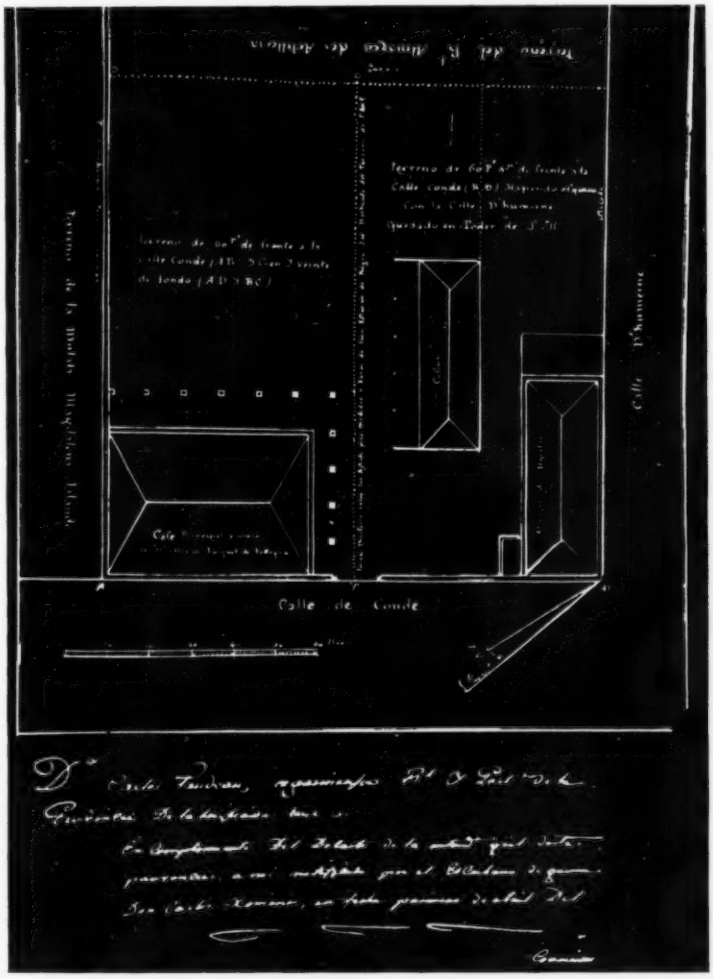
retto, but history has recorded his endeavors which offers ample proof that leprosy was most prevalent on his arrival.

For twenty years after the hurricane these people roamed the streets and became dispersed throughout the city and country.

Miro, the second Spanish Governor, in 1758 established them on a section of land skirting the city. This was made possible by the beneficence of Almonaster y Roxas.

Most Illustrious Lordship:

I, Don Andres Almonaster y Roxas, wishing to serve Your Lordship, with due respect state: that I have built a Hospital for lepers with four wards capable of lodging the same number of white families; also, I have built another separate Hospital with the same number of wards for colored people, all at my own expense; said Hospitals having been built at the extreme end of one of my farms which is located near this City, adjoining on one side, the lands belonging to Josef Custidas and on the other the Canal made for the bathing of the patients, which Canal will serve as a boundary line to said Hospitals, which I graciously dedicate to Your Lordship so that the lepers, who at the present time are very numerous in this City, may be lodged in said Hospitals, and the public may permanently enjoy this benefit, for which purpose, I formally donate in perpetuity



Map of the Leper Hospital (1799).

said buildings, renouncing all rights that I have and may have on said buildings and the land which I have donated and is located within the aforesaid boundaries.

New Orleans, April 20, 1785.

(Signed) Andres Almonaster y Roxas.

No. 101
April 20, 1785

Donation made in perpetuity, by Don Andres Almonaster y Roxas, to the City, of the ground-plot of the Hospital for the lepers, and all buildings which he had had constructed thereon.

SPANISH DOMINATION (1770-1792)
(CABILDO RECORDS)

The institution proper must have housed fully thirty-two lepers. Besides, there were thatched covered shacks scattered about the land. The bathing ditch that gave the boundary of the land emptied into the Bayou St. John.

Some would have it that shortly after this was established, the disease disappeared for a period of eighty years, only again to appear at the time of the foundation of the pesthouse on Hagan Avenue and Gravier Street. The following document shows that these parties were mistaken:

Let it be known that I, Don Estevan Fuignet de Pellegrue, resident and Senior Physician of the Royal Hospital of this City, do declare that His Majesty (God grant him long life) by virtue of a Royal order, dated at St. Ildephonso, Spain, on the fourth of August, 1798, addressed to this Intendancy, granting me a permanent donation of a city lot, 70 ft. frontage and 120 ft. depth, cornering with Conde, and Dumaine Streets, bordering on Dumaine Street with a lot occupied and owned by the Royal Treasury, (The Royal Artillery Arsenal) fronting on the river levee next to the property of the succession of Don Espiritu Listau.

The mentioned property does also border on the Conde Street side, with the property of the free mulatto woman, Magdalene LaLande, as it is evident by the plan enclosed herewith, which was made by the Royal surveyor, Don Carlos Trudeau and should be archived in the office of the Intendancy.

I had a two story brick house erected at my expense on the adjoining lot, to the one His Majesty donated me, to erect in the entire land a hospital for leper patients.

To which testimony we the undersigned, do hereby attest our signatures in the City of New Orleans, April 12, 1799.

(Signed) Juan Bautista Blache

(Signed) Don Carlos Gallard.

(Signed) Juan Ventura Morales

(Signed) Don Miguel de Riseda

(Signed) Don Estevan Fuignet de Pellegrue.

Before me,
Carlos Ximenez,
Notary Public.

Louisiana State Museum—File No. 40, Box No. 86. Year 1799.

DATA ABOUT "SAN LAZARO HOSPITAL" (LEPERS' HOSPITAL) AS FOUND ON BOOK No. 4087 OF THE ARCHIVES OF THE LOUISIANA STATE MUSEUM, NEW ORLEANS.*

Don Juan de Castanedo, City Treasurer and administrator of the funds of this Hospital, rendered accounts, covering the year 1799. This account showed a balance on hand of 149 pesos, 3 reals on the 31st of December of 1799. The revenues for 1799 consisted of said balance, 5 per cent interest received on money loaned to Dona Magdalena Cartier (890) pesos, 4½ reals, principal) covered by mortgages on their houses and from proceeds of an alms box established for that purpose.

This Hospital had a Guard Corps under a Corporal named Christoval Rodriguez, who also was in charge of disbursing (money supplied in small amounts by Don Juan de Castanedo) the money needed for food and the necessaries to keep the five interned lepers (during 1799). The five lepers were a white man, Jose Francisco Jorge, who was interned during the entire year, negress Clara, interned since March 29, negro Jacobo since April 30, mulatto Jose McCarty since July 7 and negress Catalina since July 8, 1799.

The following has been acquired without

*From pages 194 to 201 of original book.
From pages 163 to 169 of translated book.

much effort showing that leprosy had continued:

New Orleans Medical and Surgical Journal 1:234, 1844-45.

Table showing the number of admissions, discharges and deaths at the different hospitals of New Orleans during the months of August and September, 1844.

The U. S. Marine Hospital reported one death from leprosy from May, 1843 to April, 1844, p. 390.

MORTALITY OF NEW ORLEANS

Statement of deaths in New Orleans for the half year commencing July 1, and ending December 31, 1844, with a list of the diseases and accidents from which they occurred. Furnished by the sextons of the different cemeteries to the Board of Health:

1 death from leprosy.

In 1858, Joseph Jones, President of the Louisiana Board of Health, reported a case of leprosy on the Lower Lafourche.

CONCLUSION

Leprosy had an early beginning in Louisiana, starting many years before the coming of the Acadians. The Scotchman, John Law is responsible for having introduced leprosy into Louisiana.

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Shea, John: The Catholic Church in Colonial Days. Pps. 125-159.

7. Gayarre, History of Louisiana—Spanish Domination, pp. 166-167.

Fortier, A.: History of Louisiana, p. 109.

8. Smith, A. C.: New York Medical Journal, p. 197, 1879.

9. Donnan, Elizabeth: Document illustrative of the History of Slave Trade to America. Wash., The Carnegie Institution of Washington, 1:245, 1930.

10. The Jesuits in New Orleans and the Mississippi Valley, by Rev. Albert H. Biever, S. J., p. 20.

"It is a matter of no small interest to compare Charlevoix's report on New Orleans in 1722 with that of Father Louis Vivier's written in 1750, as recorded in the Jesuit Relations, Vol. 69, page 201: "New Orleans, the Metropolis of Louisiana, is built on the east bank of the river. It is of medium size and the streets are in straight lines; some of the houses are built of bricks and others of wood. It is inhabited by French, negroes, and some savages. All these together do not, it seemed to me, number more than twelve hundred persons . . ."

"In former years when eight or ten ships entered the Mississippi, that was considered a great number; this year (1750) over forty entered, mostly from Martinique and San Domingo."

11. Miller's Survey, N. M. The Commerce of Louisiana, Vol. 21, p. 234.

"On the arrival of the slave ship, the Health Inspector was the only person permitted to go aboard. He separated the sick from the well . . . the sick were sold at auction . . . there were some persons who made a business of buying them. These doctors who bought them were careful to put their curative secrets in practice only for themselves. Slavery brought such excellent returns that merchants, financiers and even doctors entered into the traffic."

12. Works of Mezeray, Virchow, and Simpson. The latter in Edin. Medical and Surgical Journal, (1841-42).

13. Franz, in his "Colonization of the Mississippi." (Leipzig, 1906) writes: "The company even kept a whole regiment of archers, who cleaned Paris of its rabble and adventurers, and received for this a fixed salary of 100 livres a head, and even honest people were not safe from them."

And again says: "Prisoners were set free in Paris in September, 1719, under the condition that they would marry the lowest type of women and immigrate. They were chained and dragged to the port of embarkation. In 1720, such action was prohibited; however, it did not prevent the shipping of a third lot of lewd women in 1721. The first came in 1719, the second in 1720."

DISCUSSION

Dr. A. E. Fossier: I note that the Doctor has found the same difficulty encountered by historians, that is, finding the truth. This can be done only by research and, even then, the real truth is hard to find because almost all of history is hearsay, and events have been repeated time and time again until they become an established fact. It is the duty of the student of history not to take these statements for granted, but to try to establish their authenticity. This Dr. Dimitry is striving to do.

I am not altogether ready to accept the statement that John Law brought the lepers into Louisiana for I am inclined to think that leprosy was introduced by the negro slaves from the West Coast of Africa, and also by the trading vessels from the Gulf ports.

I fully agree with Dr. Dimitry that the Acadians should not be accused of having introduced leprosy into Louisiana. Only unauthentic evidence has blamed them for something they are not responsible for. It is probable that they were the victims of this disease and that they had acquired it here in Louisiana. Conditions in the city at that time were such as to be disposed to the transmission of leprosy. Sanitation was at a low ebb, and because of the slave traffic and the financial losses resulting from sickness of these unfortunates, it may be possible many were admitted with the disease. Besides, the health officers did not have the refinements of diagnosis we have today.

This is a splendid paper and more theses of this character should be presented to the Society.

Dr. Rudolph Matas: Everyone delving in the medical history of Louisiana will appreciate Dr. Dimitry's paper as a valuable and interesting contribution to the discussion of a very pertinent and mooted question.

Why has leprosy stamped its exotic pathology more conspicuously upon Louisiana than upon any other state? Not only upon its pathology, but upon its laws and its literature as well?

Without trespassing too much upon Dr. Dimitry's argument, I do not feel that we can hold John Law and his Mississippi Bubble as responsible for the introduction of the disease early in the 18th century through the numerous immigrants from Germany and Western Europe who had been lured to Louisiana by the glitter of his fantastic speculations. Nor, should we blame, as has been done, the exiled Acadians who came later (1764-5) from Acadia (Nova Scotia) to find a refuge in our southern parishes. Rather should we attribute the origin of leprosy in Louisiana to the slave traffic which, beginning in 1719, had crowded the colony under Bienville in 1732 with over 2,000 slaves who brought with them, all the pathology including leprosy, that characterized the negro populations of West Africa.

Later still, it is evident that though the first record of a home for lepers is attached to the abortive administration of the first Spanish governor, Ulloa (1765), leprosy prevailed in the Colony long before that time.

It would seem almost certain that leprosy was constantly fed in the late colonial and post-colonial period by the close and intimate relations with the French colonies of San Domingo, Haiti, Martinique, and with Cuba and the Spanish West Indies, where leprosy had been indigenous long before its appearance in Louisiana. It would seem from this that leprosy came to Louisiana from multiple sources and that the earliest of these was through the West African slave trade.

Dr. Dimitry's paper apart from its historical merit has suggested many recollections of my student days, when as an interne at the Charity Hospital in 1879, I was in charge of a leper ward. There were about 15 lepers who had been segregated in that ward for lack of any other place to put them. Father Boglioli was the hospital chaplain for the catholic patients at that time, a very benevolent Italian priest who had virtually consecrated his life to his ecclesiastic duties. I still remember him visiting the sick and administering the last sacrament and otherwise living in the hospital and in the community without the least social restrictions. I was so interested in the patients in that ward, that I had seriously considered writing my graduation thesis on my hospital observations, and particularly the case of Father Boglioli, himself, who was the only person known to have contracted the disease in the long history of the Hospital. Long before his retirement his features gradually assumed the leonine and most characteristic facies of the disease. I have always thought of him as the Father Damien of Louisiana.

Distinctly do I remember also, that on Common Street (now Tulane Ave.) there was a fruit stand midway between the hospital and the Medical School (later the site of the Tulane Theatres). The eldest son of the Italian fruit vendor developed leprosy and remained at the stand for years selling oranges, bananas, and other fruit to the students, long before the disease was recognized and yet no one seemed to have contracted the disease. These, and other facts that came under my observation at the time, impressed me deeply with the very rare and exceptional contagiousness of the disease and the extraordinary natural immunity enjoyed by the great mass of the population despite the most intimate contact with the typically infected individuals in the most favorable conditions for its inoculation (tropical heat and mosquitoes). The relative rarity of leprosy in Louisiana at the present time and in the countries where it prevailed epidemically in the middle ages, and, later, when leprosariums for the afflicted dotted the land everywhere, suggests that quite apart from segregation and sanitation, the wide diffusion of the disease and its filtration through the social strata of the many varieties of mankind in the course of its millennial existence, has led to a gradual immunization by hereditary dilution of the modern world.

Dr. Dimitry (In conclusion): I wish to thank both Doctor Matas and Doctor Fossier for their discussion. I was fearful that the chair would rule against a discussion of historical contributions. These gentlemen have helped me call attention to an error of the historian, viz, that of the Acadians bringing leprosy to Louisiana.

Neither would agree with me on how it was brought, but we do agree that Blanc and Dyer were wrong when they repeated that the Acadians brought it. If the negro was responsible, then why did he select to infect only the Louisiana Colony? Negroes from the same source went in greater numbers to the other Colonies.

Dr. Matas reminisces on Father Boglioli, the Father Damien of Louisiana, and calls attention to the story of "Tombleau Blanc" a romance of Louisiana in which a leper is the hero. I have recently published an article in the Year Book of Hotel Dieu on "The Early Nursing of the Leper" and in the article I make comments on Father Boglioli.

This present contribution was written, hoping to lead to a third contribution, one in which the

Leper's Champion is to be narrated. The great character is Dr. Isadore Dyer. He worked at all times for the interest of the leper, yet only a few years have passed and he is forgotten. The Lazaretto at Carville is truly his monument.

Doctor Dyer was a remarkable man and at all times willing to work in behalf of these unfortunates. Had he lived they would be receiving the care of the nation's learned ones. The scientists would be gathered in consultation. As it is now they are isolated in a quasi military camp and receiving but a modicum of the nation's help.

DELAYED OPERATION FOR ACUTE HEMATOGENOUS OSTEOMYELITIS*

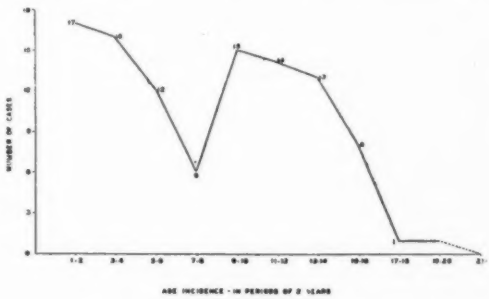
HOWARD R. MAHORNER, M. D.†
NEW ORLEANS

Though for decades scientific medicine and surgery have been in the front line of advancement of the human race, the profession is still not above Galenizing a procedure to such an extent that to question its supremacy may invite a storm of criticism. In such position today is the problem of management of acute hematogenous osteomyelitis. For decades, with the assurance of supreme accomplishment, students have been taught the doctrine of urgency in this disease, based upon the traditional axiom already modified for certain other conditions, "Where there is pus it must be evacuated," interpreted as indicating immediacy and in this disease at times anticipation. Recently, however, such strong and such peculiar evidence has been accumulating[1, 11] that one begins to listen more attentively to such fanciful ideas, questioning whether or not, as soon as the diagnosis is made, operation is imperative in this condition.

The material upon which this study is based is 112 cases of acute hematogenous osteomyelitis admitted to Charity Hospital of Louisiana from 1930 to 1936 inclusive. During that same period there were 390,735 admissions, an instance of one case in 3,490 patients (0.03 per cent). This by no means includes all the cases of osteomyelitis, for excluded from the study were all cases in which operation had been done previous to admission, cases in which the disease was in a chronic stage, osteomyelitis by contiguity or by extension from an adjacent focus, as for example an infected tooth or sinuses, or osteomyelitis from compound fracture. Excluding osteomyelitis from compound fractures, there were 1,787 cases of osteomyelitis, acute and chronic, in this same period. Thus, this study includes only the small percentage of cases which were admitted in the acute stage of the disease and which had not previously been operated upon, cases in which the lesion definitely originated by metastasis through the blood stream.

AGE, SEX, RACE

Of the 112 cases, the youngest patient was six months of age, the oldest fifty-nine years. The greatest number of cases for any single year was in the fourteenth (11); and in the fourth (10 cases). In the first five years, there were 37 cases (33 per cent); in the second five years of life, 29 cases (25.9 per cent); from eleven to fifteen years inclusive, 33 cases (29.5 per cent); from sixteen to twenty years of age inclusive, 4 cases (3.6 per cent), and twenty-one years of age and over, 9 cases (8 per cent). Acute hematogenous osteomyelitis is obviously a disease of growing years, and occurs most commonly during the period when bone growth is most active.



ACUTE HEMATOGENOUS OSTEOMYELITIS

Chart 1. Graphic representation of age distribution of cases of acute hematogenous osteomyelitis. The disease is one of growing years and after the sixteenth year is not common.

As is usual in such studies, the disease was found more commonly in males. There were

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*Read before the Louisiana State Medical Society, Monroe, April 28, 1937.

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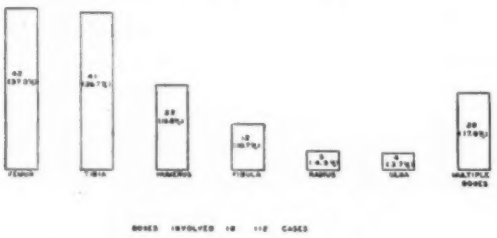
80 males (71.4 per cent) and 32 females (28.6 per cent).

Negroes apparently are not as susceptible to the disease as whites. There were 85 white patients (75.8 per cent) and 27 negroes (24.2 per cent); whereas white patients accounted for 58.5 per cent and negro patients 41.5 per cent of the admission in this same seven year period.

BONES INVOLVED

Acute hematogenous osteomyelitis notably attacks the long bones, generally in the region of the metaphysis. In this series of cases single bones were involved in 92 instances (82.2 per cent), and two or more bones were involved in 20 cases (17.8 per cent) (Chart II). In



ACUTE HEMATOGENOUS OSTEOMYELITIS

Chart 2. Graphic representation of relative frequency of different bones involved in acute hematogenous osteomyelitis. The femur and tibia are involved in a majority of cases. Multiple bones are involved in 17.8 per cent.

18 of the cases in which metastatic lesions occurred, two bones were involved and in two cases, three bones were involved. The right side was as commonly involved as the left (femur, 22 right, 20 left; tibia, 21 right, 20 left; humerus, 11 right, 11 left). The femur was involved in 42 cases (37.5 per cent) and the tibia was involved in 41 cases (36.7 per cent). The humerus was next most commonly affected, 22 cases (19.6 per cent). The fibula was involved in 12 cases (10.7 per cent), the radius in five cases (4.5 per cent). The frequency with which other bones were affected were: ulna, four cases; vertebra, one; calcaneus, one; rib, one; sternum, one; scapula, one, and astragalus, one.

SYMPTOMATOLOGY

It is not the purpose of this paper to consider in detail symptomatology and diagnosis of acute hematogenous osteomyelitis. In making this study, however, attention was paid to the symptomatology, which will be discussed briefly. The more dominant clinical characteristics are pain and fever. The pain, most commonly in the region of the joint, is frequently misleading, but, objectively, the point of maximum tenderness found on the diaphyseal side of the epiphyseal line with the possibility of hematogenous osteomyelitis kept in mind will usually indicate the correct diagnosis. There is frequently a history of recent dermal or oropharyngeal infection, and often a history of recent trauma (occurring from six days to eight weeks previously in this series) at the site of bone involvement. In 53.5 per cent of the cases the admission temperature was 103° F. or over. Other symptoms are nausea and vomiting, rarely convulsions, high sustained temperature, rapid pulse, delirium, severe toxemia, leukocytosis. In 33 per cent of cases, leukocytosis was 15,000 or above. The highest leukocytosis in this group was 45,000 cells per cubic millimeter. There is a relative and actual increase in the neutrophiles. Locally, tenderness is an early finding. Swelling and redness of the part may appear twenty-four to forty-eight hours after onset. Brought to its simple analysis, in the acute stage, acute hematogenous osteomyelitis presents two pictures: one, that of a severe septicemia or bacteremia, and the other that of a local infection in the bone. There are no methods of precision in the diagnosis of hematogenous acute osteomyelitis in the early stages.

ROENTGEN RAY EXAMINATION

The roentgen ray is of no value in the early diagnosis of acute hematogenous osteomyelitis. In this study it was frequently found negative seven and eight days after the onset; was occasionally negative as long as two weeks after the onset; was positive in one instance, if the history is correct, on the second day, and one instance on the fourth day of the disease. It is rarely positive before the eighth to the tenth day. The earliest appearance in the roentgenogram of the disease is usually an elevation of the periosteum, which generally becomes evident about the eighth day. Very soon after this osteoporosis is noted, generally about the eleventh to the fourteenth day. Osteoporosis may be the first roentgenologic sign of the disease if the process is deep in the bone. Osteoporosis, a mot-

tled decalcification of the bone, while not pathognomonic of acute hematogenous osteomyelitis, is with the clinical appearance definite evidence of the disease. Sequestration or the third roentgen ray stage of the disease was not found on the eighteenth and twenty-third days of the disease, never definitely present until the fourth week. The presence of sequestrum in the roentgen ray is manifested by an area of density surrounded by an area of osteoporosis. (Fig. I.) The sequestrum, the radio-opacity of

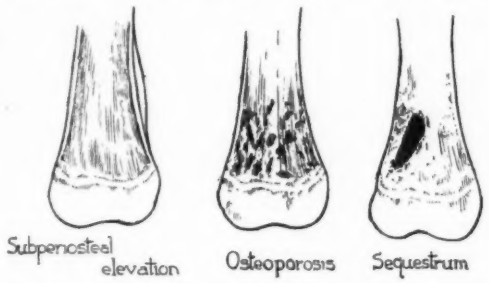


Fig. 1. Three x-ray stages of acute hematogenous osteomyelitis. The earliest roentgenologic evidence of the disease is elevation of the periosteum which may be present about the seventh day. The second x-ray stage, or osteoporosis, may be present about the eleventh day. A sequestrum definitely demarcated from the living bone is not discernible until the fourth week.

which approaches that of normal bone, is a fragment of bone from which the blood supply has been cut off entirely. The osteoporotic area surrounding is evidence of inflammatory involvement. The roentgen ray, though of no value in the early stages, is of great value in the third roentgenologic stage of the disease or in the stage of sequestration to determine the extent of bone destruction and the amount of new bone formation.

PATHOGENESIS

The pathogenesis of hematogenous acute osteomyelitis as far as the local lesion is concerned is still a debatable question. Trauma, slight or moderate, is too frequently an historical fact to be disregarded as playing a part. Even slight trauma undoubtedly makes a place of lowered resistance. It was recorded as a predisposing cause in 26 per cent of these cases. Fine, subperiosteal, incomplete fractures of the cortex may occur, with slight local hemorrhages, a nidus for the growth of metastasizing organisms. The usual explanation of the pathogenesis of acute hematogenous osteomyelitis is that organisms lodge in the end-arteries of the metaphysis, that the process spreads rapidly up and down the marrow cavity and by traversing the Haversian canals becomes subperiosteal. This undoubtedly occurs in some instances, but it undoubtedly also occurs that the focus may begin in the arteries of the Haversian canal or in the subperiosteal vessels, and then the progress of the pathology may be reversed. In a number of instances (21 out of 88 operations) in the present series, pus was found at operation in the soft tissues or under the periosteum, but not in the medullary cavity though the bone was opened. Though not conclusive, this is evidence supporting the theory that osteomyelitis may begin in the subperiosteal region. Apparently the initial focus in the bone may be in one of three sites (Fig. 2): The organism may lodge in the end-

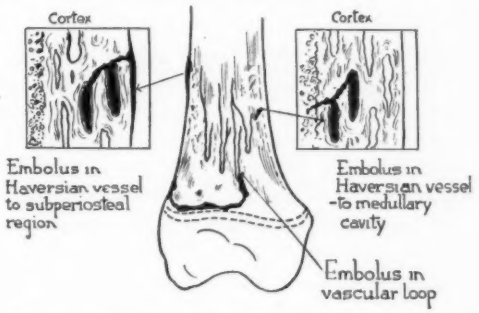

Cortex
Cortex
Embolus in Haversian vessel to subperiosteal region
Embolus in Haversian vessel to medullary cavity
Embolus in vascular loop

Fig. 2. Diagrammatic representation of three locations in the bone at which a focus of osteomyelitis may originate. (1) From an embolus in the terminal arteries of the vascular loops of the metaphysis, the process may progress through the metaphysis along the epithelial plate to the subperiosteal region. (2) The process may begin in the Haversian canals and rupture under the periosteum or into the medullary cavities. (3) It may begin directly under the periosteum.

arteries of the metaphysis and spread from there through the marrow cavity to the surface through the Haversian canal; secondly, the primary embolus may be in the cortex itself in vessels of the Haversian canals, spread thence to the subperiosteal region or to the medullary cavity, or it may begin in the periosteal vessels, form a primary abscess subperiosteally and spread through the Haversian canals, involving the cortex, and then to the medullary cavity. Though this primary process is still debatable, unquestionably thrombosis of the vessels occurs, resulting in ischemia with ultimate necrosis of irregular areas of the

bone. The process of regeneration and repair goes hand-in-hand to a certain extent with that of destruction, the periosteum being raised, new bone is formed thereunder. When cortical destruction has taken place, the granulation tissue which fills the necrotic area after removal of the sequestrum slowly or never becomes osseous again.

BACTERIOLOGY

Usually the Staphylococcus aureus is accredited with being the most common cause of acute hematogenous osteomyelitis. In this series, blood cultures were taken from 41 cases. Twenty were positive, 21 were negative. There were 10 deaths in the patients with positive blood cultures, or 50 per cent. There was one death in the patients with negative blood cultures, or 4.8 per cent. Staphylococcus albus was the causative organism, according to the blood cultures, in 11 cases, Staphylococcus aureus in four. In one case there were both Staphylococcus albus and aureus, and in three cases staphylococcus type not stated. In one case a non-hemolytic streptococcus was the cause. Of the 10 deaths in the positive blood culture, Staphylococcus albus was present in six blood cultures, aureus in two, staphylococcus type not stated in one, and the streptococcus in one.

Blood cultures are very important, not only from the standpoint of prognosis, but also of therapy. When positive blood cultures are obtained, the prognosis is much more grave. Repeated blood cultures with increasing numbers of colonies generally indicate that emboli are being liberated from a focus, generally in the bone. A positive blood culture does not always indicate that the organisms are coming from the secondary lesion in the bone. They may be gaining access from the primary lesion on the skin or in the nasopharynx or may be actively multiplying in the blood stream. It is reasonable to suppose that in most cases when there is more than one bone involved the second bone becomes involved by virtue of emboli liberated from the focus in the first bone and not from the primary focus on the skin or in the pharynx. However, in rare instances undoubtedly the second bone involvement is a metastatic lesion from the primary lesion from which the first bone was involved.

Cultures were taken from the bone in 76 cases. In 63 (82.9 per cent), the culture was positive. In 17.1 per cent it was negative. In 32 cases (42.1 per cent) of those cases in which cultures were taken from the bone, the Staphylococcus albus was isolated. In 21 cases (27.6 per cent), Staphylococcus aureus was isolated; in five cases, (6.6 per cent), a staphylococcus, type not stated, was isolated. Thus, the staphylococcus was present in 76.3 per cent of cases from which cultures were taken from the bone. Four (5.3 per cent) had mixed infections, and in four cases (5.3 per cent), a streptococcus was isolated from the bone, in two instances of which it was nonhemolytic, one hemolytic, and one Streptococcus viridans.

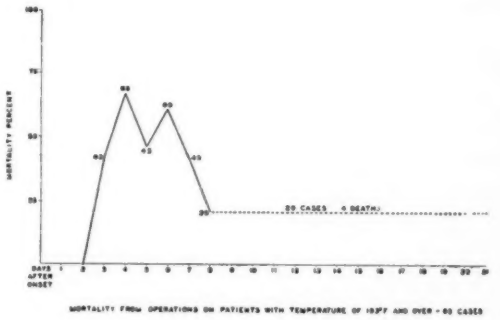
MORTALITY

A detailed study of the mortality in these 112 cases is exceedingly interesting and instructive. Four of the patients were not operated upon at all. One of these was aspirated, the others received no operative treatment whatsoever. They all recovered, one deserting the second day after admission. Amputation was done in an additional case under the mistaken diagnosis of Ewing's sarcoma. Thus, there are 107 cases in which operation was done. Twenty-seven (25.2 per cent) died. This unusually high mortality may be due to the fact that any case about which there was doubt of its being a true case of acute hematogenous osteomyelitis of the metastatic variety and not in the chronic form on admission was excluded from the study. Five patients were operated upon on the first or second day of the disease with no death; 57 patients were operated upon on the third to the seventh day of the disease, inclusive, with 20 deaths (35 per cent). Fifteen patients were operated upon on the eighth, ninth, and tenth days of the disease with two deaths (13.3 per cent). After the eleventh day of the disease, 30 patients were operated upon with four deaths (13.3 per cent). Thus, it is seen that as far as operation is concerned from the standpoint of duration of the disease the mortality is higher, 35 per cent, from the fourth to the seventh day. It is lowest in this series in the first forty-eight hours of the disease, and is next lowest after the seventh day. This has its signi-

ficance, because regardless of whether it may be proved to be proper to operate upon patients within the first forty-eight hours there will always be cases which are not properly diagnosed and admitted to the hospital within the first forty-eight hours of the disease. Similar in some respects to recent studies on acute appendicitis, the operative mortality from the third to the seventh day is found to be the highest of all periods. This is so not only collectively in the periods, but the daily average is higher. The indications would seem that a case seen within this period should be given supportive treatment and operation delayed, from the standpoint of mortality alone, until a later date.

More interesting and more significant is the study of the mortality according to the day patients were operated upon after admission to the hospital. Fifty-seven patients were operated upon the same day they were admitted to the hospital, and of these 16 (28 per cent) died. Twenty-two patients were operated upon the day after they were admitted and of these nine (41 per cent) died. Seventy-nine patients were operated upon the first forty-eight hours in the hospital, and of these 35 (31.7 per cent) died. Of 29 operated upon the third day or after, one,* or 3.45 per cent, died. No deaths occurred when patients were operated upon four or more days after admission to the hospital.

The objection immediately presents itself that the very sick patients were operated upon on the first or second day they were in the hospital and that those with less severe forms of the disease were permitted to wait. In order to forestall such conclusions, another selected group of the patients was studied. Only those patients with temperature 103° F. or above on admission were included in this group. There were 60 cases that fell into this category, of which 22, or 36.6 per cent, died. Obviously these patients were the sickest of the entire series. They were all very toxic, with definite acute signs of acute hematogenous osteomyelitis. Of this group, three patients were operated upon within the first forty-eight hours of the disease. Those three patients recovered. Thirty-seven patients were operated upon from the third to the seventh day of the disease, inclusive. Of this group, 18 or 48.6 per cent died. Twenty patients were operated upon after the eighth day of the disease, and of this group four, or 20 per cent, died. It would seem from this study that the most dangerous time again to operate upon a patient with acute hematogenous osteomyelitis is between the third and seventh day inclusive. (Chart III). However, when



ACUTE HEMATOGENOUS OSTEOMYELITIS

Chart 3. Graphic representation of mortality from operation on different days of the disease in cases with temperature 103° F. and over on admission to hospital. The mortality, zero in five cases on the first and second days of the disease, rises rapidly on the third and fourth to a maximum of 66 per cent, gradually subsides to 20 per cent average after the seventh day of the disease.

these cases are studied from another angle, the mortality is more surprisingly elucidated. Thirty-five of the patients were operated upon the day of admission. Fourteen of these, or 40 per cent, died. Two of these deaths occurred when the operation was done on the twenty-first day of the disease, but on the first day of admission; one death occurred when operation was performed on the fourteenth day of the disease and on the first day of admission. These patients, of course, were severely ill when they were operated upon, even though they had had the disease for some time. Thirteen patients were operated upon the second day they were in the hospital with seven deaths, or 54 per cent mortality. Thus, 48 patients were operated upon on the first or second day they were in the hospital, with 21 deaths, or 43 per cent mortality. On the third day in the hospital, three patients were

*This death occurred from operation on the third day the patient was in the hospital.

operated upon with one death, or 33 per cent mortality, and after the third day, nine patients were operated upon with no deaths or zero mortality. These nine patients were clinically as sick on admission as those operated upon on the first day they were in the hospital.

The discrepancy between the time the patient was operated upon after admission to the hospital, compared to the time the patient was operated upon after the onset of the disease, is marked. In this study it was found that no matter how long the patient had the disease, even up to three weeks, if he was severely sick and was operated upon during the first two days he was in the hospital, the mortality was extremely high, almost one in two. The reason for this seems obvious. These patients are admitted from their homes, with high temperature, severe sepsis, and frequently after much nausea and vomiting with dehydration. Operation in this stage of the disease, instead of being a boon, is an additional burden which 43 per cent of patients cannot survive. All the patients that were operated upon after the third day of admission were as sick on admission as were those who were operated upon on the first day of admission. The mortality for the former group is zero, and the mortality for the later group is almost 50 per cent. The indications are absolute: When a sick patient is admitted to the hospital, the first thing that should be done is not operation, but administration of supportive measures; fluids, transfusions, general support of the patient to overcome the sepsis or generalized infection from which he is suffering.

TREATMENT

Such astounding results analyzed in detail as these must make us question the dictum that the treatment of osteomyelitis is immediate operation when the diagnosis is made. Osteomyelitis is fundamentally septicemia or bacteremia, and the primary treatment should be directed against this condition. Immediate attention should be paid to the general condition of the patient. He should have adequate fluid intake and measures should be taken to combat the generalized sepsis or bacteremia. The affected extremity should be supported for relative immobility. Repeated small transfusions of 200 to 300 c.c. daily are of value. Chemotherapy is of no value in the staphylococcic variety of the disease, but promises to help in the form of prontosil or prontylin when a streptococcus is the invading organism. Repeated blood cultures not only indicate the type of therapy to be directed against the general condition, but they are also of value in the prognosis, as has been indicated by the more serious mortality rate in those cases in which the blood cultures were found to be positive. Moreover, a subsiding number of colonies in the culture indicates a good prognosis, whereas an increasing or continuous number of colonies in the blood culture indicates that the thrombi and emboli are continuously being liberated from some focus of infection.

The question of when to operate for acute hematogenous osteomyelitis is still debatable. However, evidence is fast accumulating that to open the bone, regardless of time, simply because the diagnosis has been made is a grievous error. I have not been able to find previous studies in the literature showing mortality figures from operations on the different days of the disease. From this study it would seem, as far as mortality is concerned, that operation within the first forty-eight hours offers an excellent chance of recovery. However, from this study it is unquestionable that to operate upon the patient between the third and seventh day of the disease is inviting a mortality rate of one in every three cases. After the tenth to the fourteenth day, the mortality appreciably subsides, and operation can be performed without entailing such a high risk. More striking and more indicative is the fact that patients who are operated upon immediately upon admission to the hospital will have a mortality of one in three, regardless of the day of the disease, provided it is not within the first forty-eight hours of the disease. Patients who have supportive treatment for three or more days in the hospital and then are operated upon have little risk, the mortality approaching zero. Certain patients with osteomyelitis, if they were treated conservatively without operative measures, would die. There is no question about this. What this mortality rate is, is debatable. One author[2] gives 12 per cent. The statement has been made that the

delay of operation permits the disease to progress and destroy the bone, and that operation will prevent this destruction. Operation does not only not prevent it, but from a physiologic standpoint it would be hard to hit the disease center, that is, the lumen of a vessel in which there is an infected thrombus by drilling the bone in an early case. It is not the perivascular abscess which accounts for the progression of disease so much as it is the thrombus in the vessel which by propagation and by emboli cuts off the blood supply to the bone and results in sequestra. Not all cases which are left alone will result in elevation of the periosteum and destruction of the whole shaft. I show a picture of a severely sick patient who was treated conservatively by virtue of the fact that he was inaccurately diagnosed, elsewhere. His temperature was 104°, he was delirious, he was severely ill, and he had sequestration in the lower end of the femur, and yet the disease was limited there. Numerous instances of this sort could be found were we more inclined to delay and not accept the theory as an actual proved fact that delay results in more destruction of bone.

OPERATIVE PROCEDURE

In studying the operative procedures in these cases, simple incision for abscess was done in seven cases. There was one death, or 14.3 per cent mortality. Drilling of the bone was done in 43 cases, with 16 deaths, or 37.2 per cent mortality, and saucerization or curettage was done in eight cases, with three deaths, a mortality of 37.5 per cent. This includes only the patients who were severely ill, with fever 103° F. or above. Subperiosteal resection was done in one case with a resultant fatality. There is some question as to whether a patient should not be operated upon within the first forty-eight hours of the disease and the bone drilled. Future experience and evidence may settle this controversial point. Certainly from the third to the seventh day of the disease severely ill patients should not be operated upon. Furthermore, when a sick patient is admitted to the hospital with high fever, he should not be operated upon immediately, but the general support of the patient should be instituted; blood transfusion, infusion, and studies of the blood count and blood cultures should be made. Then one should wait until the acute condition has subsided. Sequestration may have occurred, but it is not roentgenologically nor pathologically distinct until the fourth week of the disease. If an abscess forms, the abscess should be incised, but there is usually no immediate necessity for going into the bone. In the third stage of the disease roentgenologically, when a sequestrum has definitely formed, I feel that to decrease morbidity and to relieve the aches and pains that these patients have continuously, a sequestrectomy should be done, removing only as much bone as is necessary to find the sequestrum and to remove it by gently lifting it out or picking it out of its nidus. Curettage in this instance is dangerous, because it opens vessels and destroys the reactionary fibrous wall which surrounds the sequestrum. Occasionally, what percentage we are not certain, a sequestrum can be absorbed. When the acute process has subsided, the abscess surrounding the sequestrated area may become bacteriologically sterile. In this instance if the sequestrum has any connection with viable bone, it is possible for revascularization to occur as in bone grafts, and thus dead bone may again be converted into living bone. This phenomenon is probably rare, but that it does occur is a consideration. When there is a strong reactive connective tissue wall surrounding the sequestrated area and the sequestrum is completely cut off from its blood supply, there is no chance of revascularization. Removal of this sequestrum will relieve the aching pain which these patients have.

CONCLUSIONS

One hundred and twelve cases of acute hematogenous osteomyelitis occurring in Charity Hospital in New Orleans were studied. The general mortality was 25.8 per cent. The mortality was highest from the third to the seventh day of the disease inclusive, (35 per cent), and was highest when the patient was operated upon the first or second day after admission to the hospital, regardless of the length of time he had had the disease. To operate upon a patient with acute hematogenous osteomyelitis as soon as the diagnosis is made in every instance is an erroneous teaching, and invites in some instances a terrifically high mortality. Conservative treatment should be practiced, at

least between the third and seventh day of the disease and for two or three days after admission to the hospital. Operative mortality is lower outside of these periods. In the acute stage of the disease, abscesses should be drained by simple incision only, because of higher mortality from procedures involving opening the bone. When the general condition is improving, and the acute stage is mitigated, the patient should be treated conservatively until definite sequestration is detectable roentgenologically. Removal of the sequestrum at this period reduces morbidity.

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DISCUSSION

Dr. James Q. Graves (Monroe): Leveuf, in 1936, discussed the advantages of delayed operations in acute osteomyelitis caused by Staphylococcus aureus and albus, while Edward T. Crossan in the Annals of Surgery of the same year discussed the conservative treatment of acute hematogenous osteomyelitis. From their studies they are of the opinion that the delayed operation is preferable to the immediate operation. Crossan classifies them as follows:

The immediate operation—done in the first 24 to 72 hours.

The immediate early operation—in three to 12 days.

The immediate late operation—after the second week.

Quoting statistics gathered by him of 121 cases, show that in immediate operation the mortality was 26 per cent, as compared to 15 per cent in the delayed operation. Within the first three or four days, the mortality was 39 per cent. If operated within the first week, the mortality would be 35 per cent. At the end of the second week, the mortality drops again to 15 per cent.

There are two essential questions to be discussed in Dr. Mahorner's paper: first, in the opinion arrived at in the light of present day knowledge as to when is the best time to operate: early, immediately, or late. His studies compare favorably with Crossan and Leveuf in that Dr. Mahorner's statistics show that within the first 48 hours the mortality is lowest, and that between the third and tenth days the mortality again drops. Unfortunately, the diagnosis can seldom be made during the first 48 hours. In many cases, therefore, the advantage of an operation is not possible. During the first 48 hours the patient is less toxic, and the temperature is lower. The operation might resolve itself into a simple incision and drainage. Between the third and tenth days, the temperature reaches its highest point, ranging from 103° to 105°, the patient is more toxic, the tissues are dehydrated, and the resistance is lower. After the tenth or twelfth days, some immunity has been established, the localized abscess is walled off in certain cases; surgery is then most favorably instituted, with the best results, if not operated on within the first 72 hours.

The second question of importance is whether or not to open the medulla. Again, the work of others compares favorably with that of Dr. Mahorner in that the mortality is lowered by not opening the medulla, unless there are existing convincing evidences favoring such a radical procedure.

Blood cultures should be made for diagnostic purposes, as well as prognostic. Not always is the culture positive; when negative, the prognosis is better.

Crossan reports 171 cases of hematogenous osteomyelitis that were operated on, and in only 12 cases was pus found in the bone; pus in the bone and beneath the periosteum in 24 cases; and pus beneath the periosteum in 42 cases; and pus beneath the periosteum only, confirmed by decompression, in 39 cases. Eighty-one of this number were found to have periosteal pus with only 36 cases involving the bone and periosteum, thus showing a higher percentage of periosteal abscesses alone than with the periosteal abscess and bone involvement.

It is best not to operate on these cases early or late if they are dehydrated and highly toxic until they are given the proper preoperative treatment, consisting of repeated small blood transfusions, with sufficient fluids intravenously to maintain the normal water balance in the tissue, and general preoperative care. Again, it is best, if subperiosteal pus is found, to evacuate and drain, and not to disturb the bone if the patient's

condition is serious. Later, if there is bone involvement, formation of sequestrum will take place, which, I agree with Dr. Mahorner, should be left alone until a second operation can be done for the removal of this sequestrum.

If we are dealing with a streptococcus type, prontosil intramuscularly and by mouth has proved, in many instances, almost a specific. Prontylin is also being used in blood stream infection.

Dr. John T. O'Ferrall (New Orleans): I do not think it is quite fair to let Dr. Mahorner's paper go by without adding my thanks to him for the illuminating statistics given. I think it does emphasize the fact that so many of the men in general practice who see early osteomyelitis, for those are the men who usually see it, depend entirely on roentgen ray for diagnosis. The roentgen ray shows nothing, therefore, they think nothing should be done. I believe if a very careful study of these cases of osteomyelitis in the long bones was made in the initial stage, operation, as suggested by Dr. Mahorner would be safe in most cases. After the patient has become toxic and very sick, he certainly should not be operated upon until the proper time as outlined by Dr. Mahorner.

Dr. Guy Caldwell (Shreveport): I think we all appreciate the very excellent preparation of this paper and the splendid analysis that has been given. The results that Dr. Mahorner has reported are very similar to those tabulated in several reports from other parts of the country. Dr. Graves mentioned one or two and the report that John Wilson, of Los Angeles, made a year or so ago gives percentages very close to those of Dr. Mahorner.

Dr. Mahorner brought out two or three additional points well worth stressing, particularly the one with reference to treating the patient for a day or two after he enters the hospital and before submitting him to operation. Since I gave a paper before this Section on this same subject some twelve years ago, our conception of the disease and its pathologic changes has altered and, as a result, we have gradually grown more conservative. At that time, I was doing an immediate operation on nearly every case that came into the hospital. I recall distinctly, however, that there have been three patients operated upon within the first forty-eight hours of their disease who died promptly.

Patients with osteomyelitis, as a rule, reach us late in the first or early in the second week, and usually we wait for a day or two until their condition is better before operating, and since we have done so our results are unquestionably better. We have gradually grown more conservative. To have the results of a series of cases carefully studied and reviewed as Dr. Mahorner has presented them gives us a reason for becoming more conservative, and it is very important that we should.

Dr. C. O. Wolff (Haynesville): From the paper just given us, it was shown that the operative mortality rate in the first 24 hours is practically nil. In my own experience, which is limited of course, all the cases that I have seen operated on very early, in the first 24 hours, are the ones that have no residual trouble, that get well without being crippled and without further operations. I believe that it should be stressed that if these cases were diagnosed very early by the practitioner, that better results would be obtained by early operation. Everybody agrees that between the third and tenth days when the patient is very sick, waiting is better.

I think this should be stressed and not leave the impression that it is not important to diagnose acute osteomyelitis early.

Dr. Mahorner (In conclusion): There is one point that Dr. Caldwell and Dr. Wolff mentioned which I think is still in a state of indecision. From clinical studies there seems to be no question that there is a danger period for surgery in this disease. Results in this particular series indicate, as Dr. Wolff pointed out, that the mortality is lower in the first forty-eight hours. However, I was glad to hear Dr. Caldwell make the point that he had had cases operated upon within the first forty-eight hours with resultant death. Deaths do occur when operation is performed in the first forty-eight hours of the disease, but the actual mortality for operation in that period has not been accurately determined. There are too few cases to be sure what the mortality in that period is. The question as to whether cases should be operated upon if the diagnosis is made within forty-eight hours after the onset is still, as far as I am concerned, an undecided point. It may be that with further studies, as detailed as this, grouping cases into days of the disease on which they were operated upon, we will find that like appendicitis, there is an optimum time, within the first forty-eight hours, and when that has passed delayed treatment is best. That is still unsettled and it remains for many studies to prove that point.

Recently, I was still further convinced of the value of delayed operation for acute hematogenous osteomyelitis. I saw a case on the first day of the disease, a child running high fever, having pain in the leg, tenderness over the lower end of the tibia, and every indication of the disease except roentgenologic. The roentgen ray is of no value at this stage. So convinced am I of the value of conservative treatment I decided not to operate but to wait. In the period of a week symptoms subsided. The process never went on to suppuration and the child remained well. Was this a true osteomyelitis or a periostitis? I do not know, but I do know that if I had been convinced

that the thing to do was to operate immediately for osteomyelitis, I would have operated. And should I have gone ahead and drilled the bone I would have introduced the infection into the medullary cavity and would most certainly have had a prolonged course of hematogenous osteomyelitis.

It is only more studies of the disease that will give us this point as to whether we should operate within the first forty-eight hours. At the present time, I know operation should not be done when the patient is acutely ill between the third and seventh days of the disease.

PARATYPHOID AND RELATED BACTERIA IN CUTANEOUS AND SUBCUTANEOUS LESIONS*

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NEW ORLEANS

Bacteria of the paratyphoid or Salmonella group have occasionally been isolated in man from lesions remote from the intestinal tract. These micro-organisms are mainly associated with enteric disturbances, rarely producing a bacteremia or septicemia. Invasion of the blood stream by the paratyphoid organism appears associated with symptoms as severe as encountered in typhoid fever. Localized lesions of the paratyphoid group may follow a recognized systemic invasion, and also appear without a history of antecedent enteric disturbance or obvious bacteremia.

LITERATURE

The literature dealing with the systemic invasion of the Salmonella group has in later years received several scattered case reports. Harvey[1] recently reviewed the literature on the suipestifer type, presenting fifty cases with a definite diagnosis, and contributing twenty-one additional cases. Maxwell[2] reports two cases of paratyphoid infection of the upper respiratory tract. Gijon[3] records a case of arthritis and Cohen,[4] a case of pericarditis with pneumonitis. Two cases of paratyphoid osteomyelitis occurring at the Charity Hospital of Louisiana were reported by Veal[5].

From the case reports it appears that the paratyphoid group has no particular site of predilection when producing localized pathology beyond the intestines. The etiology of the abscess is rarely anticipated. On exposure, the purulent material may suggest the B. coli group. Routine bacteriologic examination usually establishes the nature of the micro-organism. The antibody titer of the blood in such patients rarely exceeds that incurred in the gastrointestinal types of infection.

A parallelism in the pathologic and immunologic picture is found between the Salmonella infections and those produced by the coli, typhoid and proteus organisms in so far as concerns abscess formation.

A search for case reports on Salmonella infections of the skin and subcutaneous tissue has failed. No doubt such infections have been observed. By comparison it may be noted that subcutaneous abscesses from typhoid bacilli are recorded as uncommon, if not rare, and infections by the Proteus group recognized as frequent.

DISCUSSION OF CASES

A recent instance with fatal termination, caused by Salmonella morgani in association with non-hemolytic streptococci and staphylococci, led to a re-examination of several somewhat similar infections having been observed at the Charity Hospital since May, 1936.

Of the cases herewith reported, two patients died, one incurred amputation of a leg, a fourth suffered infection of the hand with necrosis into the metacarpal bones, one was lanced for a compound fracture and one had extensive ulcerations on one leg.

Four of the six cases occurred in colored people. In one fatal case, complications were diabetes and a chronic bacillary dysentery. A second fatal case had a mixed infection, following an injury to the right knee. Marked arteriosclerosis was present in the patient on whom amputation of a leg was necessary. The remaining three had no obvious complicating constitutional factors.

Certain impressions seem of sufficient sig-

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*Read before the Louisiana State Medical Society, Monroe, April 28, 1937.

nificance for comment. In two cases with fatal termination, over 1000 c.c. of pus was evacuated from fluctuating masses in the thighs. Toxic manifestations were lacking and severe localized pains absent in these and the other patients.

The fever charts fail to show the elevation of temperature and the "septic" nature as encountered in deep staphylococcus abscesses.

In four instances the extraneous source of infection seemed evident. In one case the hematogenous route was fairly definite, as the abscess formed in the thigh during the patient's stay in the hospital. In the sixth case the source remains doubtful.

A very limited number of stool and urine cultures failed to reveal these as possible sources of surface pollution. The white cell counts and chemical urine examinations were too few to permit deductions.

No difficulties were experienced, and this appears to be the rule, in the isolation and culture of the bacilli from these cases. Their proper classification has been a matter of concern for reasons that should be more commonly known.

In view of the undoubted pathogenicity of these micro-organisms it is hoped that similar cases be more frequently recorded and that the various laboratories preserve and consolidate such isolated cultures. It will then be possible to effect a more satisfactory classification of members of the Salmonella and the Proteus group. The material at hand suggests the formation of a third group to include strains now loosely placed in either two aforementioned.

CLASSIFICATION

In the American classification of micro-organisms by Bergey[6], the so-called paratyphoid bacilli which is a most heterogenous group, constitute a part of the Salmonella (the new terminology). The so-called Morgan bacilli are also in this group. In the English classification, according to Topley and Wilson[7], the Morgan bacilli are listed with the Proteus group.

The differentiation of the Salmonella and the Proteus groups hinges to a large extent on the failure of the former (Salmonella) to ferment sucrose and failure to liquefy gelatin. It becomes somewhat confusing to find the Morgan bacillus which does not react on the two media, in the Salmonella group and to have the American classification list several species that fail, like the Morgan bacillus, to ferment sucrose and liquefy gelatin in the Proteus group.

Fermentation of sugars by bacteria as a means of classification today no longer enjoys the prestige of former days. It is, however, useful within limits. Bacteriology today concerns itself more with so-called antigenic complexes in learning what substances are held in common and apart. It is on the basis of such analysis that Raus[8] (and accepted by Topley and Wilson) places the Morgan bacillus with the Proteus group.

The interpretation of reactions with sucrose is attended with greater difficulties than that encountered with other sugars. The very slow liquefaction of gelatin can be interpreted on a different basis than from its rapid digestion. Nor is the use of gelatin in many southern laboratories so rapidly carried out at the proper temperature of 20°C.

The micro-organisms isolated from these cases had characteristics of the Morgan bacilli. Serologically two strains appear related to paratyphoid B and the aertrycke strains. None fermented sucrose when used with difco peptone. Nor was mannite fermented. Slow liquefaction of gelatin was produced by four strains but no "swarming" or motility was observed, yet in all other cultured respects they differed from the species of the Proteus group in the American classification.

In view of the present trend to classify on the basis of structural components (antigenic complex) the final identification may have to be deferred until more such strains have been gathered. The use of gelatin as a means of differentiation is at present unsatisfactory. The possible development of other simple means for differentiation for the use of smaller laboratories should be encouraged.

It would appear that there exists a group of bacilli intermediate between the recognized and extensive paratyphoid varieties and such forms of the Proteus group encountered in the urine and as secondary invaders in surgical wounds. Several similar strains have been isolated at the Charity Hospital from deeper abscesses. In destructive action they are as severe as streptococci and staphylococci.

CASE REPORTS

Case 1. L. A., a colored male, aged 58, sustained an injury to the right knee. Two weeks later the infection was lanced and drains inserted. As a result of the continued infection the patient entered this hospital, after a lapse of an additional two weeks. A large fluctuating mass extending upward from the knee on the medial aspect of the thigh was noted. Roentgen rays revealed no pathology of the femur and partial destruction of the cartilages in the knee. Incision two days after admission yielded 1200 c.c. of pus. The culture of the pus revealed non-hemolytic streptococci, Staphylococcus albus and a Salmonella morgani.

The patient died two weeks later. The autopsy diagnosis reported acute suppurative arthritis, dilatation of the heart and luetic mesaortitis.

The serologic data are: negative Wassermann reaction on the blood and no agglutination for typhoid, paratyphoid B, Flexner and Hiss dysentery strains.

Throughout his stay in the hospital (sixteen days) he was afebrile, except for slight elevation of temperature on the last four days.

Case 2. M. G., a colored female, aged 50, was admitted because of pain in the left leg. The patient had been diabetic for three years and suffered a persistent diarrhea. A possible subcutaneous abscess of hematogenous origin was suspected. Two weeks after admission a 12 cm. incision was made in the left leg and 1000 c.c. of pus drained. A culture from the wound shortly after lancing gave a pure culture resembling Salmonella morgani, but liquefying gelatin. A clinical study had demonstrated reddened shallow ulcers of the intestinal wall and no parasites had been found. Serologically the patient showed agglutination in 1:320 for Flexner type dysentery bacilli.

On admission a white cell count of 17,000 was noted. The blood sugar on admission was 252 mg. per 100 c. c. blood, with urea nitrogen of 14 mg. The diabetes was fairly well controlled with insulin.

In spite of supportive measures and adequate drainage from the wound, the patient died seven weeks after admission. The anatomical diagnosis from the autopsy was: cellulitis of left leg and thigh, toxemia, diabetes mellitus.

The temperature reached 103° prior to incision, then dropped to 101° and remained at this level until death.

Case 3. S. G., a colored male, aged 57, was admitted for pain and swelling of the left leg. The symptoms had been present for three weeks. Trauma or previous ulceration of the leg was denied. Although poorly developed and undernourished, the patient did not appear acutely ill and throughout his stay of three and a half months had but slight fever.

The left leg showed anteriorly on the upper third a fluctuating area with tenderness over the tibia. Roentgen rays revealed no bone or periosteal changes; roentgen rays of the lungs were essentially negative. The Wassermann reaction was negative.

Aspiration was made five days after admission and four days later incision was made. Culture from the wound was obtained on two occasions two weeks after incision, and yielded a Salmonella morgani-like organism that liquefied gelatin slowly.

Three weeks after admission amputation above the knee was performed. The wound continued to discharge purulent material for a month. Twice was it necessary later to remove protruding bone. Examination of the amputated leg showed thrombophlebitis and arteriosclerosis.

A single feces culture was negative for typhoid and dysentery bacilli and yielded an organism similar to that from the wound. This culture unfortunately was not kept for serologic study.

Case 4. V. P., a colored female, aged 48, was admitted for ulcers on the left foot of six weeks' duration. The patient had originally scratched a pimple on her left ankle. Owing to spread of the infection, she was treated unsuccessfully at the dispensary. The entire left foot and leg was swollen. Many shallow, separate and confluent ulcers of the skin were found on the anterior and medial surfaces of the leg. Cultures on two occasions from under the wound edges gave a few streptococci and staphylococci and large numbers of bacilli resembling Salmonella morgani, but liquefying gelatin. Roentgen rays revealed no bone or joint involvement. The Wassermann reaction was negative and the blood sugar and blood urea were normal.

A fever not exceeding 100° existed for three weeks, when it became normal. The patient was discharged greatly improved after nine weeks. Cleaning and application of dressings was the only treatment employed.

Case 5. L. S., a white male, aged 25, had a laceration on the back of the right hand which was incurred in a fight, when the patient struck the teeth of his opponent. Two stitches were inserted immediately after the injury in the acci-

dent room of the Charity Hospital. The next day the hand was swollen and treatments were carried on for one week. Incision and drainage were then done, but no improvement followed.

A month after the onset of the injury the patient was admitted to the hospital. On two occasions surgery was necessary owing to bone necrosis of the third metacarpal bone. Smears of tissue and from the wound did not show fuso-spirochetal infection. Cultures yielded a non-hemolytic streptococcus and a bacillus of the Salmonella morgani type, slowly liquefying gelatin. Agglutinins in the blood were found in titer of 1:160 for typhoid and for the isolated bacillus. The urine and feces did not yield organisms that fermented lactose.

The patient was discharged after two weeks with a healing wound.

Case 6. H. S., a white male, aged 35, was admitted for infected comminuted fracture of the left femur, fracture of the left radial and ulnar bones and phlegmon of the left hand.

A month after admission open reduction of the femur was performed. After an additional two months, incision of the same region was necessary. The pus yielded a pure culture of a bacillus resembling Salmonella morgani, but liquefying gelatin readily. The motility of the organism was positive, sucrose fermentation was negative. Spreading of colonies and pleomorphism of bacteria was absent.

The patient at this date, six weeks later, is still in the hospital. The femoral wound is still discharging pus. The patient has been afebrile since infection was incised.

CONCLUSIONS

1. Bacilli resembling the Salmonella morgani, but some liquefying gelatin, have been isolated from six cases of infection in the skin of subcutaneous tissue.

2. These organisms, directly or associated with other factors, were responsible for death in two patients and amputation of a leg in a third case.

3. The immunologic response to these organisms differs from common pyogenic infections.

4. The present classification employed in the Salmonella and Proteus groups appears inadequate.

5. A greater interest in reporting clinical cases with similar infections will assist in a better classification and encourage the study of immune processes involved.

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DISCUSSION

Dr. J. K. Howles (New Orleans): I think we are all greatly indebted to Dr. Fasting for bringing to our attention these unusual manifestations of the paratyphoid group, the so-called Salmonella group.

We are all acquainted with the systemic and cutaneous, mostly systemic, manifestations and complications of the typhoid bacillus. Recently there has crept into the literature a considerable number of reports of an increasing nature of the complications of a systemic type of the paratyphoid or Salmonella group.

There is all the reason in the world to believe that this disease should produce systemic reactions and cutaneous reactions, as much so as the typhoid. No doubt most of you, I am sure, and I am one of them, are a bit hazy about the classification of this particular group of diseases, and I beg of you not to be annoyed at your haziness, because the specialists who deal with this particular type of bacilli are just as much at sea. I think Dr. Fasting's report will help clear up this muddle and help to establish some sane and acceptable classification between the two schools, particularly the American and the English classifications.

I am interested primarily in the clinical aspects, therefore, and I should like to touch just briefly upon these cases as presented by Dr. Fasting. Some of them were definitely of hematogenous origin, and they are the most important. We have every reason to believe that we should find localized abscesses in the skin. Since evidence of the infection is found in the bones and in the organs, why shouldn't it be found in the skin, which is one of the means of excretion, and in which are found so many similar abscesses associated with concomitant disease. For instance, a necrobiosis, as frequently found in diabetes, to me is comparable to this condition. The ones that were caused apparently by extrinsic infection were usually associated, if I understeand it correctly, with contaminating organisms, staphylococci and streptococci, and other flora that are usually found on

the skin. It is absolutely impossible to sterilize the skin without harming it to the point that you kill it, and with all the indentations and invaginations, the openings into the skin, such as the sweat and sebaceous orifices, it is natural that a number of infectious organisms would creep into the skin, get into the deeper layers, into the intercellular spaces, and eventually set up inflammation.

The thing that impressed me about the localization of these lesions Dr. Fasting spoke of was that most of them occurred on the lower extremities. That could possibly be explained, especially from the extrinsic standpoint, by soiling from stools and other excretions.

It also seems to me that the low temperature, the low degree of toxicity, and the extreme amount of pus that was found in these cases all speak for concomitant infection that co-existed with this disease.

I, for one, am very grateful to Dr. Fasting for emphasizing the importance of the laboratory study of cultures, and the examination of smears. At once the thought comes to my mind, what about the poor country practitioner who hasn't the time or the equipment to do all that? The answer to that is, where there is a will there definitely is a way. Our greatest contributions in medicine have come from these country practitioners who have found the time and the inclination to find the way.

THE PRESENT STATUS OF SERUM THERAPY IN PEDIATRICS*

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CHICAGO

In discussing the present status of serum therapy in pediatrics, I will consider it from the standpoint of available serums. These are the animal (mostly horse) serums, either antitoxic, antibacterial, or these in combination, and the human convalescent serums.

A potent serum corresponding immunologically to the infection to be treated, given in sufficient dosage early in the disease is of aid in bringing about recovery if no serious complicating factors exist. The value of the serums decreases as the dose is diminished from the proper level or as the disease progresses. It should be further remembered that the passive immunity conferred by immune serums is of short duration, lasting on the average only some two weeks or slightly longer. For a further understanding of the curative value of this class of products it may be mentioned that with most antitoxins laboratory tests give an accurate estimate of their actual immunity value, but with antibacterial serums the parallelism is by no means so close. This is because of the difficulty of reproducing in suitable experimental animals such infectious diseases of man as pneumonia or meningitis, although such toxemias as diphtheria and tetanus may be approximated closely enough in guinea pigs and other common laboratory animals. There still remains the little understood realm of the non-specific stimuli of which serum proteins are capable. It should be borne in mind that the injection of foreign protein, especially in the amounts represented by the average serum dose, alters the individual's physiologic response to subsequent injections of a similar protein as well as presenting the dangers of immediate or delayed serum reactions. For this reason the use of heterologous animal serums should be limited to situations warranting their use.

DIPHTHERIA ANTITOXIN

This serum represents one of the greatest advances in applied immunology. From time to time its antitoxic content per given volume has been increased, the product has become more stable, and has been freed to a large extent from the non-specific proteins. This serum is used in both passive immunization and therapy.

In diphtheria the toxin unites first with the adjacent tissues, the excess passing by way of the lymphatic channels to the blood and so throughout the body. Two factors are of great aid in the matter of treatment with this serum: First, that in an ordinary case of diphtheria only a very moderate amount of toxin escapes being fixed by the local tissues at the seat of the disease and passes to the blood within the first 24 hours; in the second place, there is a period of a few hours after the toxin has come into contact with the cells when the union is incomplete and the toxin can still be neutralized by the antitoxic serum.

Dosage is dependent on the time element and the manner of administration. It is obvious that the sooner it is given, the greater the probability of neutralizing the toxin before it has produced any lethal effect upon the tissues.

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Intramuscular administration is recommended for mild and moderate cases, while in severe cases, those showing laryngeal involvement, and neglected cases of the nasal type, both intravenous and intramuscular administration are recommended. It is to be remembered that serum is absorbed from an intramuscular injection to produce a maximum blood concentration within 24 hours, whereas in an intravenous injection the total antitoxin is available immediately.

The serum is most valuable when the entire dose is given at the first injection and in sufficient quantities to meet the exigencies of the case. The following table will prove an adequate guide for the dose to be used.

TABLE No. 1

Weight of Patient	Moderate	Severe
Under 50 lbs.	10,000	50,000
Over 50 lbs.	20,000	100,000

Any hesitance about dosage should be dispelled by the decision to administer the larger amount recommended.

Any suspicion that a patient is suffering from diphtheria demands the immediate injection of antitoxin in full doses without waiting for a bacteriologic report.

During the past two years an increase in the incidence of diphtheria has been reported in various sections of the United States, with the presence of a greater number of severe and malignant types. This has been noted even in sections where intensive active immunization has been practiced. There has also been an increase of the disease in adolescents and adults. These cases demand large doses and early administration of serum. It is therefore necessary, in the presence of such increased incidence and severity, to re-Schick children so that the susceptibles may be located and re-immunized. In cases recently exposed and those showing positive cultures, serum administration is indicated for immediate protection.

The continuous intravenous administration by the drip method of large amounts of 10 per cent glucose in normal saline seems to be beneficial to those patients showing toxic effects upon the parenchymatous organs, chiefly the heart and liver. The introduction of fluids intravenously must be slow, in order not to overburden the heart. One or more liters in 24 hours, depending upon the weight of the patient and the ability to eliminate fluids, are recommended.

TETANUS ANTITOXIN

The specific treatment of tetanus with tetanus antitoxin was introduced more than thirty years ago. Although it has been employed extensively since that time, the voluminous literature that has accumulated is quite diverse and conflicting in regard to the value and methods of serum therapy in cases of tetanus.

It is generally agreed and has been amply demonstrated during the World War, that as a prophylactic, tetanus antitoxin ranks with diphtheria antitoxin as an absolutely specific means of prevention of the disease when properly administered. Because of the nature of the disease, in that operation may be necessary or the injury continues to suppurate, and because serum is eliminated rather rapidly from the body, a single dose is usually insufficient. A subcutaneous dose of 1500 units, preferably near the site of the wound, repeated at weekly intervals until the injury is healed, should provide adequate protection.

In the field of therapy, however, the use of serum has not been attended with the same success. One fact is outstanding to the effect that every hour lost after development of symptoms makes the prospect of success less bright. It is a well established fact that cases developing clinical symptoms of the nervous system during the first four to eight days show exceptionally high mortality, while those developing in the second week show a much lower death rate and not infrequently recovery without therapy.

Sedative therapy is indicated as an initial procedure in every case. Avertin, per rectum in dosage of 50 mg. per kilo body weight has proved effective in many cases. Its administration should be preceded by a cleansing enema carefully administered. It may be repeated as indicated, or supplemented by sodium amytal by mouth or intravenously in proper dosage. Morphine sulphate in small doses has been used to produce a prolongation of the avertin sedation.

Antitoxin Therapy.—Antitoxin should be given as promptly as possible, but not until the patient is under the control of the sedative. Avoid doing a spinal puncture except when

doubt exists concerning the diagnosis. Intraspinal serum injections cause headache, fever, and in many instances may start convulsions of a serious nature. Give a large intravenous injection of antitoxin. Often it is preferable to dilute the serum with normal saline and to administer it by gravity, thereby reducing the possibility of sudden anaphylaxis. In cases with incubation periods of about a week approximately 60,000 units may be employed. In those with shorter periods of incubation, doses up to 200,000 units might be recommended. It is the first injection which is of definite value. In many cases subsequent injections are thereby avoided. In all cases be prepared to treat anaphylactic shock with adrenalin.

Surgical Treatment. — Surgical treatment should be delayed until the convulsions have been controlled.

Nursing Care and Symptomatic Treatment.— A special nurse is to be on duty with the patient at all times throughout the 24 hours as death from asphyxia may occur in the absence of an attendant.

Patients who are unconscious from large doses of sedatives often require frequent aspiration of the nasopharynx. This aids in the prevention of aspiration pneumonia. Frequent changes of position, when the patient is sound asleep, also serve to prevent pneumonia.

Close attention is to be given to the fluid intake. Dextrose is especially indicated in the first stages because of previous starvation and exhaustion. The feeding schedule and manner of feeding are to be determined by the condition of the patient.

The patient should have frequent sponge baths, as discomfort from heat and perspiration is a cause of restlessness and even of convulsions.

The occurrence of the serum reaction from the fifth to the tenth days of the disease (after administration of serum) is a critical period. Convlusions may recur of alarming severity and cause sudden death from asphyxia. Consequently, adrenalin hypodermically should be used as often as necessary, together with the local application to the body surface of carbolized calamine solution to which menthol has been added in appropriate amount.

Blood Transfusion.—In cases of severe exhaustion, blood transfusions may cause marked and sudden improvement. The blood should be given as slowly as possible because of the state of exhaustion.

ERYSIPELAS ANTITOXIN

The new preparations are both antibacterial and antitoxic, having been developed in the blood of the horse as a result of the graded injection of toxins and living cultures of Streptococcus erysipelatis.

Gordon and Young report that the results obtained with the serum were sufficiently gratifying in 248 cases to warrant further studies. Reports from Bellevue Hospital are to the effect that they have experienced good results with the newer products now on the market.

In the evaluation of what may be expected from treatment with this serum, several factors warrant consideration: The age, especially in children, is most important—very young infants show the least response; variations in the severity of the disease from year to year are quite marked; and the site of distribution of the erysipelas lesions on the body affect the severity of the disease profoundly.

ERYSIPELAS CONVALESCENT SERUM

Convalescent serum has also been used with variable success in the treatment of this disease. In some cases early administration of a large dose of convalescent serum (60-80 c.c.) is attended by a drop in temperature and rapid improvement in the general condition; repeated dosage may be necessary. In other instances, results have been unsatisfactory. In my experience, intravenous use of human convalescent scarlet fever serum has been more effective than convalescent erysipelas serum. I have seen some instances of marked improvement following the additional use of the newer preparations of erysipelas antitoxin.

In Cook County Hospital, as well as in private practice, I have experienced some very gratifying results by the daily repeated intramuscular injection of 20-40 c.c. of whole blood, especially in the case of young infants. Where blood is used, it is well to take it from the individuals who have in the past shown a marked resistance to streptococcus infections. In older children I have seen many striking results fol-

lowing intravenous transfusion. The danger of infecting the donor must be borne in mind and careful surgical technic must be employed. Repeated ultraviolet or roentgen ray irradiation of the affected parts has proved, in my experience, to be very effective in limiting the spread of the infection and shortening the course of the disease.

SCARLET FEVER
ANTISTREPTOCOCCUS HORSE SERUM AND ANTITOXIN

Scarlet fever is another disease caused by a streptococcus in which favorable results have attended the production and use of serum. Dochez serum is prepared by injection of living cultures of scarlet fever streptococci, and Dick serum is made by injection of the filtrates of broth cultures which contain the toxin.

Passive Immunization.—Due to the fact that the contagious index is low in older children and direct and intimate exposure is often necessary to the development of the disease, together with the fact that horse serum sensitizes the patient to whom it is administered and that it is frequently accompanied by severe serum reactions, I feel that the prophylactic use of scarlet fever horse serums is not to be recommended, except under exceptional circumstances.

Therapy.—Numerous reports in the literature in general agree that antistreptococcic horse serums exert a favorable effect on reducing the severity of the toxic symptoms, the course and duration of the fever, and the extent and duration of the skin lesions.

Due to the reactions to horse serums, enumerated under passive immunization, one can appreciate the tendency to reserve this form of therapy to more severe cases.

SCARLET FEVER CONVALESCENT SERUM

Serum prepared from convalescent scarlet fever patients has been quite widely used and with satisfactory results. It is now available in many cities.

Passive Immunization.—The experience from the Deutsch Serum Center in the use of human convalescent serum in 945 individuals directly exposed to the disease resulted in the protection of 97 per cent. The doses administered intramuscularly were 10 c.c. in children and 20 c.c. in adults.

It is to be remembered that passive immunity lasts only for about two weeks, so that in prolonged or recurrent exposure repeated injections are advisable. There being no sensitization from the use of human serum, no reaction need be anticipated.

Therapy.—Our experience at the Deutsch Serum Center in Chicago, covering more than 2000 cases, leads us to expect diminution of temperature, toxemia and angina, fading of the rash, shortening of the duration of illness, and reduction in the frequency of complications. The most striking results are seen when the serum is given early and in large doses, 40-100 c.c. intravenously. In such early cases, one injection is usually adequate. Intramuscular injections are recommended when the intravenous administration is not possible.

Even when given late or when complications already exist, amelioration of symptoms and rapid recovery have taken place. It should be our aim to treat patients early in the disease, as severely complicated cases at all times offer a serious prognosis.

Where convalescent serum is not available, whole blood intramuscularly from cases known to have had scarlet fever may be employed.

Among the striking therapeutic results none are more gratifying than the recoveries one sees following massive intravenous transfusion in toxic and occasionally even septic cases of scarlet fever. Proper typing is essential. The ideal donor is one recently convalescent from scarlet fever or when such a case is not available, the second choice lies in the donor who has had scarlet fever. In septic cases one should not hesitate to repeat intravenous transfusions until recovery is assured. The end result justifies the means adopted. Careful surgical technic is paramount for the protection of the donor.

ANTIMENINGOCOCCIC SERUM AND ANTITOXIN

In meningococcus meningitis the use of antimeningococcic serum has resulted in a marked reduction in mortality and in the physical damage that follows infection with this organism. Either the serum or antitoxin should be administered in every case of meningitis due to the meningococcus, and I believe, should be administered in every case of purulent meningitis

when a definite bacteriologic diagnosis cannot be established.

The serum has been available for many years. The antitoxin which has been more recently introduced by Ferry and his associates is prepared by the injection of a filterable exotoxin into horses. There is as yet no convincing evidence that the antitoxin offers advantages over the serum.

It has long been my custom to use the serum both intraspinally and intravenously. More recently, reports have appeared advocating the use of the serum or antitoxin by the intravenous route alone, but I am still adhering to this combined method of treatment except in cases of pure meningococcemia confirmed by positive blood culture and without evidence of meningeal involvement.

The recent trend has been in the direction of increased dosage by the intravenous route. The amount advocated at present varies from 30-100 c.c., depending upon the age and condition of the patient. This intravenous dose should be repeated every 12-24 hours until the infection is definitely under control. The serum should be diluted with from two to three times its amount of normal saline solution when administered intravenously. Adrenalin should be at hand for emergency administration.

ANTIPNEUMOCOCCIC SERUM

Long-continued laboratory study has proved that the introduction of dead pneumococci (of Types I and II, at least) into the animal body leads to an active immunity as shown both by resistance to subsequent infection and by the presence of agglutinins, and other protective antibodies in the serum. Type I serum prepared according to the original or modified method of Cole and that of Felton, administered in full doses within the first three days of the attack, frequently checks the disease and reduces its fatality. Antipneumococcic serum prepared from Type II organisms has proved less efficient. Those for Type III and IV have been found to have little clinical value up to date. Unfortunately, clinical reports of organisms isolated in the various studies now available, lead us to believe that the pure Type I organisms are the specific cause in only a limited number of cases in young children; most of them fall into the Type IV group. For this reason, the horse serum treatment of pneumonia has up to this time had only a limited place in the practice of pediatrics.

Human Serum.—For the last two years I have employed pooled convalescent type specific pneumonia serum in the treatment of early cases of pneumonia in children. This clinical study is still in the experimental stage, but a preliminary review indicates that the febrile course is shortened and the toxemia relieved. Because the mortality of pneumonia in children is low, the study must wait until it contains enough cases to be able to draw any conclusions in this regard.

ANTISTREPTOCOCCIC, ANTISTAPHYLOCOCCIC, AND ANTIGONOCOCCIC ANTIBACTERIAL SERUMS

While these serums contain specific agglutinins, complement-fixing and other antibodies, their therapeutic action is variable and no definite prophecy can be made as to results because of the difference in reaction of the human organism to these infections and the varying virulence of the various strains among these groups.

A number of reports have appeared, particularly in the English literature, on the use of scarlet fever antitoxin in hemolytic streptococcus infections with favorable results. Because human serum is available, I have employed convalescent scarlet fever serum in hemolytic streptococcus infections. Several reports have appeared in the literature, which indicate a benefical effect exerted by such therapy in many instances, although the results are not so uniformly striking as should be expected from a specific serum.

More recently I have seen some striking results following chemotherapy in streptococcus and meningococcus septicemia. In most of my cases sulfanilamide was used together with serums and blood transfusions.

ANTIRHEUMATIC FEVER SERUM

There still remains a grave question as to Streptococcus cardio-arthritidis being the specific cause of rheumatic fever. Personally, I have had no experience with the use of this serum in pediatrics and believe it well to await further investigation as to its place among therapeutic measures.

ANTIDYSENTERY SERUM

Polyvalent serums made by actively immunizing horses with the Flexner, Shiga and other strains of the dysentery bacillus are available for the treatment of bacillary dysentery. The literature contains very few reports on the use of this serum in childhood. Personally, I have had no favorable experience with its use.

POLIOMYELITIS CONVALESCENT HUMAN SERUM

Convalescent human serum was first used in New York City in the 1916 epidemic by Draper and Zingher, who reported results that caused this form of therapy to be accepted as an effective therapeutic measure. Other reports followed, which quoted favorable results in early paralytics but more especially those treated in the preparalytic stage. Because of the nature of the disease, no control study was done until 1931 when New York City had an epidemic of such proportions that the supply of convalescent serum available was inadequate. Consequently, many cases diagnosed as preparalytic poliomyelitis were not treated with serum. The results reported by Park, Kramer and others, Fisher and Landon led to the conclusion that untreated preparalytic and paralytic cases have as high a rate of recovery as the treated cases, and they raised the question as to convalescent serum having any therapeutic value. Taking into consideration the fact that the statistics were compiled neither on alternate cases nor on a comparable series (because the untreated groups quoted by some of these authors were definitely a milder group of cases), the verdict remained that the results of the studies are inconclusive, and future studies must be made on more comparable and more completely controlled groups of cases.

Unfortunately, a study of this kind has not yet appeared. Although the results of the New York epidemic of 1931 were really inconclusive, the great doubt expressed as to the value of serum therapy caused a general reaction unfavorable to its use. It is difficult to understand this reaction.

At the Round Table Discussion on poliomyelitis of the American Academy of Pediatrics held in New York City June 7, 1935, Dr. Carl H. Laws made the following statement: "Notwithstanding the total failure of statistical presentations to favor certain types of serums, clinical observations almost universally made of rapid symptomatic response to the administration of serum by an immediate drop in temperature and marked improvement in symptoms cannot be totally disregarded. All other forms of therapy in this disease have been a signal failure, with the possible exception of spinal drainage. There appears to be enough evidence from clinical observations to warrant the continued use of serums in early stages of acute poliomyelitis."

Various reports state that 50-80 per cent of patients diagnosed as having been seen in the preparalytic stage remain nonparalytic. Cowie, Parsons and Lowenberg report that 96 per cent of 81 patients diagnosed as being in the preparalytic stage escaped paralysis, and in the three cases in which paralysis was shown, it was light and subsequently disappeared. In a group of 27 patients treated by them at the appearance of paralysis, three recovered completely, six were definitely improved, making a total of 33.3 per cent as compared with a group of 17 patients with paralysis, receiving no therapy, of whom 11.6 per cent showed improvement. Their treatment consisted of 20-30 c. c. of convalescent serum intravenously and 20-50 c. c. intramuscularly, and the intravenous transfusion of 100-200 c. c. of whole blood from either convalescent patients or from adults.

Claus Jensen, reporting on the Danish epidemic of 1934, used large doses in preparalytic and paralytic patients, which were repeated at the slightest sign of progress of the disease, and concluded that serum played a significant part in preventing paralysis.

Henry and Johnson believe that serum has value as soon as the first symptoms occur and before the onset of paralysis. The Swedish Committee on Poliomyelitis, and Christensen in an independent report, expressed the same opinion, stressing particularly large amounts of 100-300 c. c. of serum intravenously.

During the late 1936 season immediately after Labor Day, there was a sharp rise in the incidence of the disease in Illinois. A total of 618 cases were reported, of which 240 were in Chicago. The results in Chicago this year, with larger doses intravenously than were used in previous years, have been most encouraging.

Not only has the residual paralysis in the treated preparalytic cases been almost negligible, but I have personally observed many bulbar cases suffering from an unusually severe disease make striking recoveries following serum therapy. There are other factors involved in the treatment of these patients, such as the avoiding of trauma, complete rest, constant and intelligent nursing, and feeding care, necessitating in the bulbar cases often the institution of permanent nasal catheter, and further necessary equipment for aspiration of mucus by suction. It is not within the scope of this paper to take these up in detail at the present time.

At present, I am using a minimum dose of 100 c. c. of serum intravenously in children. The initial dose for adolescents, adults and bulbar cases is 200 c. c. intravenously. In the event that there has not been a satisfactory clinical response manifested by temperature drop, decrease in prostration, and cessation of progress of the disease within 12-24 hours, or in bulbar cases in 6-12 hours, a second dose of the same amount of serum is again given intravenously. Further injections are governed by the response of the patient to the therapy. Our moderately severe and bulbar cases have received 200-400 c. c., all intravenously.

In passive immunization, Flexner and Stewart have advocated 10 to 20 c. c. of human serum. Proper evaluation of this prophylactic measure is extremely difficult because of the low incidence of susceptibility and is impractical because of the limited amount of serum.

In the absence of convalescent serum, pooled normal adult serum or even blood transfusions may be considered as a substitute measure. The blood of city bred adults has, in many individuals, high virus neutralizing properties.

Efforts directed towards active immunization by means of vaccines have met with many difficulties and must be considered in the experimental stage.

The report by Armstrong and Harrison on the use of picric acid alum nasal spray as a preventive against poliomyelitis aroused much interest and speculation. During the 1936 poliomyelitis epidemic, two of my patients had their nasal passages treated for ten days, and a third case for twelve days, previous to the development of symptoms. Previous to the spraying, these three cases had been directly exposed to active cases and had been under observation by their family physicians throughout the incubation period. The realization that acute hemorrhagic nephritis or other toxic effects may follow the use of picric acid, as reported by Rutledge in the October 17, 1936 issue of the Journal of the American Medical Association, should make us hesitate to use extensively or indiscriminately the picric acid alum spray.

ANTIMEASLES SERUM

Many and varied have been the bacteria that have been described as being intimately associated with measles, if not the sole cause of it. I need only mention the serums prepared by Tunnicliff, by Ferry and Fisher, and by Degkwitz. The experiences reported following the use of these serums are inconclusive.

In 1918 Nicolle and Conseil used convalescent serum in passive prophylaxis and since that time the use of such serum has become widespread, with a consistent success of either complete protection or modification of the disease in over 90 per cent of the cases. The dose is 3 c. c. for infants, increased to 10 c. c. for older children. Usually, when given within four days after exposure, an attenuated disease is likely to follow. After this period no modification of the measles can be expected even when larger doses are given. It is advisable to secure complete protection in children under three years of age and in sick or malnourished children; but in older and healthy children measles attenuated by serum administration is desirable, for the latter produces a permanent immunity, whereas in those completely protected, the immunity is of short duration. In 2412 measles contacts treated with measles convalescent serum from the Samuel Deutsch Serum Center, complete protection was secured in 57 per cent and attenuated measles appeared in 37 per cent. Of those contacts in which the serum failed to protect, many were given an insufficient dose or received the serum administration too late in the incubation period.

Pooled adult serum has also been used in doses of 20-40 c. c., depending on the size of the patient, with quite satisfactory results. Whole blood parenterally in quantities of 30 c.c.

or more given intramuscularly soon after exposure will also modify the course of measles in the great majority of instances.

Placental extract, first advocated by McKhann as a means of preventing measles in exposed children, has been equally effective. The commercial products, however, have not been as innocuous as the material prepared by McKhann, and severe reactions at times have been encountered. With greater care in the preparation of the product, or refinement of the material, placental extract should be a valuable prophylactic measure.

Recently some clinical investigation has been carried out at the Samuel Deutsch Serum Center on the use of convalescent measles serum in the treatment of measles. The serum was administered in 50 c. c. doses intravenously when Koplik's spots were observed but before the rash had appeared. This study is still in its incipiency, but indicates that modification in the disease is produced, as determined by the low temperature, milder symptoms, and atypical rash.

CHICKENPOX CONVALESCENT SERUM

There are a number of reports showing that when convalescent serum was given in 5-10 c. c. doses within the first two days after exposure to chickenpox, the serum has proved quite effective in producing complete protection. The Samuel Deutsch Serum Center reports show complete protection has been secured in over 90 per cent of exposed cases. Gordon and Meader reported 92.7 per cent complete protection. Other reports are less favorable.

Due to the fact that it is difficult to secure and maintain any appreciable quantities of convalescent chickenpox serum, an attempt has been made to evaluate the use of pooled normal serum in the same manner as it is used in measles. Such a measure is of real necessity in a contagious disease hospital. With the use of 40 c.c. of normal pooled serum in exposed susceptible children in the contagious disease hospital, a protection rate of over 90 per cent has been achieved.

MUMPS CONVALESCENT SERUM

Alfred F. Hess, Barenberg and Ostrofi found that 6-12 c. c. of whole blood from convalescent patients when injected before the seventh day after exposure, was highly protective. Smaller amounts, 2-4 c. c., of serum injected before the seventh day after exposure are reported by Regan as giving excellent results, only one of 70 developing the disease. Skrotsky employed 5-15 c. c. Delavergne and Florentine feel that injection of serum in 20 c. c. amounts soon after the appearance of the parotitis exerts an ameliorating effect on the course of the illness and the frequency of complications.

PERTUSSIS CONVALESCENT SERUM

Debre, using pertussis convalescent serum in 3 c. c. doses, reports that if given early in the incubation period, it produces complete protection; if administered towards the end of the incubation period, a mild illness follows; but if given during the invasive period, it will not influence the disease. Gillot reports similar findings. There are but few reports on the therapeutic use of pertussis convalescent serum. Battley feels that in 20 c. c. doses the serum causes marked improvement, while Lesne and Petot are convinced that although there is no effect on the number or intensity of the paroxysms, the serum exerts a markedly beneficial effect on pertussis bronchopneumonia. Due to the high mortality of pertussis in very young infants, we are about to undertake the treatment of such infants with human convalescent pertussis serum. I believe this problem worthy of serious consideration.

PERTUSSIS VACCINE

For completeness, a word may be necessary covering the prophylactic use of commercial pertussis vaccines. In my experience, while I am meeting with some mild and an occasional more severe case of whooping cough in previously vaccinated children who have passed a sufficiently long period to have developed immunity, nevertheless I am favorably impressed with its possibilities.

CONCLUSIONS

It may be seen from this review that serum therapy, highly satisfactory in some diseases, is unsatisfactory in others; that it may be highly effective in prophylaxis but discouraging in therapy. Although there is no gainsaying the value of statistical analysis in establishing the efficacy of therapy, such means should not be

the only criterion in arriving at a conclusion. Clinical observations in individual cases are guides that should not be disregarded. In many conditions where mass statistics show questionable results, individual observation of cases points to the contrary. Serum therapy is still in its developmental stage. Refinement and concentration of serum, more complete knowledge of the disease, of types, and of similarities and dissimilarities of the different strains of organisms will undoubtedly lead to even more satisfactory results. The development and success of serum therapy during the short time it has been in use, gives promise of further success in the future.

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TRANSURETHRAL PROSTATECTOMY*

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Surgical methods of relieving urinary obstruction caused by hypertrophy of the prostate gland have been discussed liberally during the past decade. At the present time opinion concerning the relative value of various methods is just as divided as it was at the outset. There are many reasons for this difference and nothing worth while can be added by attempting explanations. Suffice it to say that unwarranted criticism of other methods has been voiced by advocates of each type of prostatectomy. After careful study of the subject, Hugh Cabot, an unbiased observer, has recently written: "The real nub of the question turns upon the decision as to who is to treat by operation these people with obstructing prostates. If they are to be treated in the future as in the past, largely by the general and perhaps occasional surgeon, then the indications are for an operative method as nearly foolproof as can be. But this does not seem a high ideal for surgical practice. If it is the standard that we are to accept, then we must take it with the mortality which in this country at least has rarely been below 15 per cent or even 20 per cent. That any elderly man is likely to shy at such a risk will be evident. If these men are to be treated by experts, then transurethral resection can already claim over 5000 such cases carefully observed in which the mortality has been below two per cent and the hospital confinement has been less than

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a week, with functional results the equal if not superior to those obtained by the older methods."

At The Mayo Clinic, during the year 1936, 750 patients were accorded surgical treatment for prostatic hypertrophy. One of these patients was subjected to suprapubic prostatectomy because fixation of the hips by arthritis prevented abduction of the legs; hence, urethral instrumentation was impossible. The remaining 749 patients were accorded transurethral prostatic resection. A brief consideration of these cases seems in order.

TYPE OF CASE ENCOUNTERED

It is an interesting fact that contrary to common opinion the mean age of patients who are requesting and who are being subjected to transurethral resection has steadily increased. The operation is not being applied as a prophylaxis against subsequent development of urinary obstruction. On the contrary, the increase in the average age as well as in the actual number of patients submitting to operation has been due almost entirely to the large number of men in the eighth and ninth decades of life who, having heard of friends who safely withstood operation, themselves elected to seek relief of long standing annoying urinary obstruction which they had tolerated rather than accept the risk of prostatic enucleation. Certainly, the operation in such cases has proved a great boon. Because of a large increase in the number of men beyond the age of seventy years, the percentage of men less than fifty-five years of age, who have been subjected to operation, has declined to 6.8 per cent of the entire group. Furthermore, more than half of this last group were men who suffered from inflammatory bars and contractures rather than adenomatous prostatic hyperplasia.

The degree of urinary obstruction matters not at all; in fact, the patient who has complete retention which has required catheterization for weeks or months is generally a better subject for operation, as the repeated drainage of urine has kept the muscle tonus of the bladder good. In contrast, the patient who still is able to void and yet has a pint or more of residual urine generally has a flaccid bladder which sometimes recovers slowly in spite of very thorough operation. In such cases uremia may exist; hence, treatment preliminary to operation will be necessary.

PREOPERATIVE PREPARATION

Many recognized authorities on the subject of urinary retention say that preparation preceding operation should be identical, regardless of the choice of surgical method for relieving the obstruction. When one considers the difference in approach to the prostate gland, such statements certainly seem illogical. Physical examination should be equally thorough, but other than that the indications for preliminary treatment are different. It has been the practice for years to drain the bladder through a urethral catheter preliminary to suprapubic prostatectomy. The operative approach is then through the abdomen. On the other hand, if the method chosen is transurethral resection, urethral insult with catheters prior to operation should be kept at an absolute minimum. Unless definite renal insufficiency exists, preliminary drainage by an inlying urethral catheter should be avoided. By following this principle, fever and chills, both prior and subsequent to operation, will usually be avoided. During the year 1936, approximately 70 per cent of the patients were operated on without resorting to preliminary drainage with an inlying catheter.

CHOICE OF INSTRUMENT AND TECHNIC

The surgeon should choose the type of resectoscope with which he is most familiar. At times, it has seemed that postoperative reaction is less if a punch type of resectoscope is used rather than one in which cutting is done by electric activation of a wire loop. Probably, in equally skilled hands, postoperative morbidity is about the same with any of the standard types of resectoscope. I prefer to use the knife punch and during the past two years have employed only the Thompson resectoscope. With this instrument large amounts of tissue can be removed within a reasonable operating time. During 1936, the average weight of tissue removed was 17.2 gm. and in 164 cases the removal of 30 to 112 gm. was necessary in order to produce a satisfactory anatomic and functional result. Unless the obstruction is thoroughly removed, a poor stream, tenesmus, dysuria, fever and finally protracted pyuria are inevitable. A false idea prevails that resection

of only enough tissue to form a gutter through the prostatic urethra will result in complete restoration of function. This is distinctly a misconception; unless all of the prostatic tissue which projects into the bladder is thoroughly removed, a large nodule of tissue may at any time fall into the internal urethral orifice and obstruct the flow of urine. I have seen many cases in which transurethral operations resulted in exactly this type of continued urinary disability.

Operative technic can only be developed by actual experience. One quickly learns the various tricks which are essential to success in manipulating the resectoscope. Thorough knowledge of the anatomic landmarks and keen study of the gross differences between the appearance of adenomatous hyperplastic tissue and the fibrous tissue of the prostatic capsule are requirements which must be tediously mastered. Haphazard, slipshod resection of fragments from scattered areas in the prostatic urethra will only result in trouble for the misguided patient. Removal of tissue from the region of the neck of the bladder, or in other words, from the vesicoprostatic juncture and the base of the gland, must be relatively thorough and complete. Tissue may often be left near the verumontanum in the apex of the prostate gland, with impunity, particularly when the gland is unusually large. In about 10 per cent of cases a second operation must be done before normal urinary function is restored.

POSTOPERATIVE CARE

Adequate control of hemorrhage and thorough constant drainage of the bladder through a urethral catheter are the two most important points in postoperative management. Well-made hemostatic bags are now available and are being used more and more. Following inflation with an ounce or so of water, slight traction is exerted on the bag and excellent hemostasis is generally produced. The catheter to which the bag is attached should be irrigated regularly in order to prevent the blockage of its lumen by small blood clots. Traction on the bag should be released within three or four hours, lest the external sphincter be injured by long continued pressure. Generally, at the end of twenty-four hours the bag can be deflated and replaced by an ordinary catheter. At the end of forty-eight hours, the catheter should be removed and the patient permitted to void as he pleases. Six hours later, a catheter is passed again to determine the presence or absence of residual urine. Unless the patient has voided all but an ounce or two of urine, an indwelling catheter is again inserted and fastened with adhesive tape. If at the end of a week, micturition is not effortless and complete, another operation is performed.

After patients leave the hospital they report regularly at the office where the urine is inspected grossly, and watched particularly for evidence of late hemorrhage. If this occurs, reinsertion of a catheter for a day or two is generally the only measure needed, but in exceptional cases the bleeding must be stopped by fulguration.

It has been our practice at the clinic to prescribe methylthionine chloride (methylene blue) in doses of one grain (0.065 gm.) three times daily. This drug generally is soothing both locally and mentally, particularly for the patient who worries about each micturition.

By the end of the second week, the very large majority of patients will have practically clear urine and will urinate only once or twice each night. At the end of a month, healing is complete in all but rare cases, and most of the patients void urine free from pus and do not have nocturia.

COMPLICATIONS

Hemorrhage and infection of various sorts accounted for most of the complications. During 1936, hemorrhage which was regarded as severe occurred in 3.5 per cent of the cases. One should not hesitate to return the patient to the operating room to evacuate clots from the bladder and stop the bleeding by electrocoagulation; this was done in sixteen cases during the year. Suprapubic operation for the control of hemorrhage is never necessary; at least it has not been in my experience. Blood transfusion after control of the hemorrhage is a wise procedure; if there is ever any doubt whether it is required in any case, the best policy is to give it anyway.

Epididymitis occurred in thirteen cases. At the clinic we do not routinely ligate the vas

deferens or perform vasectomy, although the latter operation was done in 161 cases (19.3 per cent) during 1936.

Chills followed by fever of varying degree occurred in 11.9 per cent of the cases. In most of the cases, however, the fever was very transitory and subsided promptly when accurate drainage was restored with a catheter. Daily recurrence of fever, which suggests pyelonephritis, was infrequent, although many of the patients undoubtedly had renal infection. With restoration of an unobstructed urethra, the infection almost always cleared up.

MORTALITY

There were eleven deaths among the 749 patients subjected to transurethral resection during 1936. This is a mortality of 1.5 per cent. One death was caused by pulmonary embolism and three deaths were caused by pneumonia. The other deaths were the result of infection within and without the urinary tract; four of them were due to septicemia. No definite explanation is available, for at necropsy in all of these cases the operative site was healing nicely and there was no evidence of perivesical or periprostatic suppuration. Three of the eleven patients died within a week, two others on the twelfth day, one on the fourteenth day, one on the sixteenth day, one on the seventeenth day, two on the twentieth day and one on the twenty-second day after operation. In most of these cases fever came on late, in several instances after the patient had left the hospital subsequent to a normal first week convalescence. In the majority of these cases, it seems unlikely that the bacteremia was produced by trauma at the time of operation; it is more likely that it occurred secondary to infection which developed a week or more later.

CONCLUSIONS

1. Complete prostatectomy by transurethral resection is a feasible operation.

2. If necessary, such operation can be performed to relieve urinary obstruction in all cases except those in which there is an enormous enlargement of the gland.

3. Routine preoperative preparation is every case will result in more harm than good.

4. Postoperative attention must be constant in order to insure thorough drainage at all times.

5. Complications are few and the mortality is low in comparison with any other type of prostatectomy.

RECENT ADVANCES IN ANESTHESIA*

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INHALATION ANESTHETIC AGENTS AND METHODS

Nitrous oxide, ether, and chloroform are still most frequently used as general anesthetic agents, while cocaine hydrochloride and procaine hydrochloride are used predominantly as local anesthetic agents. The newer types of gas machines for administering inhalation anesthetics employ the carbon dioxide absorption technic which greatly reduces the cost of anesthesia to the patient. By means of rebreathing, it is no longer necessary to use a continuous flow of anesthetic gases, since the exhaled gases are passed through soda lime, the excess carbon dioxide is removed, and they are returned to the patient to be re-inhaled. Anesthesia is continued more smoothly, because one is able to control the amount of carbon dioxide necessary to promote quiet respiration. Once surgical anesthesia is produced, it is necessary to use additional gas only intermittently, and this because some is lost through leakage about the face mask and the connections with the gas machine. A basal requirement of oxygen is the only agent which is supplied continuously to maintain metabolic processes.

This method of rebreathing by the carbon dioxide absorption has made possible the use of cyclopropane, which is a relatively expensive inhalation anesthetic. This agent, like ethylene, is inflammable and explosive, but produces more rapid anesthesia with less excitement than does ethylene and it may be used with higher concentrations of oxygen. Relaxation obtained with cyclopropane approaches that produced by

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diethyl ether; recovery from anesthesia is rapid, and the incidence of postoperative nausea and vomiting is minimal. It is important that the character of the pulse be closely watched during the induction of anesthesia, because in certain cases cyclopropane is known to produce cardiac arrhythmia. If sudden changes in the character of the pulse occur during the induction of anesthesia, it is safest to discontinue the administration of cyclopropane and change to some other anesthetic agent such as nitrous oxide or ethylene. Likewise, if, during the course of anesthesia, the patient does not seem to tolerate the agent well, which is manifested by cardiac irregularity or marked respiratory depression, or both, the concentration of cyclopropane should be diminished, or preferably, another agent should be used. If a close check is kept on the quality of the pulse and respiration, one will be more quickly aware of any idiosyncrasy which a patient may manifest in response to this anesthetic agent.

In all methods of anesthesia the intratracheal tube of soft rubber is a decided aid when there is obstruction to the airway or when there is serious respiratory collapse. In the latter case, the tube may be used to carry on artificial respiration in the event that respiration ceases. The tube may be introduced orally or through either nostril depending on the individual case. The free end of the tube may be connected by means of special adapters to a gas machine, or a face mask may be placed over it. In operations on the brain it is noteworthy that with the easy to-and-fro respiration permitted by the intratracheal tube the intracranial pressure is reduced because of the absence of straining, and surgical procedures are greatly facilitated.

DIVINYL ETHER

Divinyl ether, or vinethene, is a volatile inhalation anesthetic agent which chemically resembles both diethyl ether and ethylene. On account of its volatility a special apparatus is necessary for its administration by the closed method; however, it may be administered similarly to drop ether if the open drop method is used. The drug is definitely more potent than is diethyl ether, and the periods of induction and recovery are short. Goldschmidt and his associates, who have used divinyl ether rather extensively, said that its greatest usefulness is for operations which do not require more than a half to one hour. There is some experimental evidence to show that injury of the liver may occur with prolonged administration of this agent, especially in the absence of sufficient oxygen and when there is a depleted carbohydrate reserve in the body. The agent has been used with considerable success in obstetric anesthesia and should prove a valuable adjunct for those who have previously used chloroform entirely.

TRICHLORETHYLENE

Trichlorethylene, or trethylene, is a volatile agent which is non-inflammable and non-explosive. This is a definite advantage which most anesthetic agents do not have. Because it is relatively less volatile than diethyl ether, divinyl ether, or ethyl chloride, it must be administered carefully because a comparatively small amount will produce anesthesia. One should not attempt to force or hurry anesthesia with trichlorethylene, because there is a danger of serious respiratory embarrassment. The degree of surgical relaxation is not as pronounced as with diethyl ether, but recovery from anesthesia is more rapid. The agent has been advocated for certain reasons other than the production of complete anesthesia, namely, to relieve the pain of tic douloureux and to alleviate the pain which is frequently associated with coronary disease. The relief of pain in both instances is probably due to the production of a mild anesthesia and not to any specific selective action of the drug on individual nerves. When trichlorethylene is used for the relief of this type of pain, it is administered by placing 20 to 30 drops of the drug on a gauze sponge or a handkerchief and the patient is instructed to inhale deeply until practically no odor remains. The reliability of this agent to relieve the pain is not consistent, but it may be tried in the event that other measures have failed.

HELIUM AND OXYGEN

Helium is a relatively new gas which has found a place in therapeutics. Because of its low specific gravity (1.98), Barach suggested that it could be used advantageously in cases in which the patients were dyspneic. From a mechanical and physical standpoint, it was

found that less muscular effort would be required to move a mixture of oxygen and helium to and fro in the tracheal bronchial tree than would be required to move a like amount of oxygen. The reason for this is clear since a mixture of helium and oxygen is three times lighter than one of nitrogen and oxygen. Helium tanks may be attached to a gas machine or may be used in connection with oxygen tents. The chief therapeutic uses for helium at the present time have been cardiac disease associated with decompensation and in asthmatic conditions. In anesthesia, it has been found helpful in maintaining anesthesia in cases of hyperthyroidism in which there is retrotracheal enlargement of the thyroid gland or enlargement of the gland and pressure on the trachea which restricts the size of its lumen.

As a means of combating anoxemia, oxygen may be administered by a nasal catheter or by the more frequently used oxygen tent. The nasal catheter method is less expensive and in most instances will serve the same purpose as an oxygen tent, but one disadvantage of the nasal catheter is the discomfort which the patient sometimes experiences when the tube is in the nostril. The tip of the catheter should be placed just back of the uvula. A flow of six to eight liters of oxygen per minute will usually maintain an oxygen percentage of 50 to 60 in the region of the glottis. If the flow of oxygen is too fast, or if the nasal catheter is inserted too far into the oral pharynx, the tendency on the part of the patient is to swallow air.

LOCAL ANESTHETIC AGENTS

Procaine is probably employed more frequently for local anesthesia than any other agent, with the possible exception of cocaine. However, there is a new local anesthetic agent which is being used in local anesthesia; this is called metycaine.[6] It is both a topical and a local anesthetic which clinically is no more toxic than procaine and produces longer anesthesia with comparable doses than does procaine. The advantages claimed for metycaine over procaine are, therefore, its applicability in producing anesthesia of mucous surfaces and its somewhat longer effect. Certain individuals who develop a dermatitis from using procaine may find that metycaine may be substituted successfully.

VARIOUS METHODS OF REGIONAL ANESTHESIA

Field block of the upper part of the abdomen preliminary to laparotomy under general anesthesia aids in reducing the amount of general anesthetic required and is usually used in cases in which there is debility of a rather marked degree. For operations about the lower part of the rectum and anus, sacral block possesses all the advantages of spinal anesthesia and is accompanied by the minimum of untoward reactions. Operative procedures on the neck, such as laryngectomy, thyrotomy, and dissection of lymph nodes, can be accomplished satisfactorily by blocking the cervical[8] plexus when it is not advisable to use a general anesthetic.

In selected cases, spinal anesthesia is employed for abdominal operations below the diaphragm and for operations on the lower extremities. It is contraindicated in the presence of marked loss of weight, definite anemia, low blood pressure, or cachexia. Similiarly, certain nervous and apprehensive patients are usually poor candidates for this type of regional anesthesia. The dose of the agent to be used should be determined by the consideration of the age, weight, height, and blood pressure of patient, the concentration of hemoglobin, and type of operation which is to be performed. In general, when procaine or metycaine is used, no more than 1 mg. per pound of body weight is administered.[5] When other agents are used, a similar equivalent ratio is calculated.

In certain operations on the upper part of the abdomen, spinal anesthesia is intentionally combined with a general inhalation anesthesia. In these cases, a small dose of spinal anesthetic is administered in order to minimize the amount of general anesthetic. As a rule, the incidence of nausea or vomiting is increased when spinal anesthesia is used for operations on the upper part of the abdomen. Inhalation of oxygen and carbon dioxide frequently will suffice to control nausea.

Peridural anesthesia is produced by the action of the anesthetic agent on the spinal nerves extradurally and on the spinal ganglions and paravertebral sympathetic nerves. The technic of the injection, which is somewhat more difficult than when subarachnoid block is used, requires more skill and care[7,9]. The chief advantages of this method, according to Dogliotti,

are: (1) absence of danger of diffusion of the anesthetic toward the bulbar and cerebral centers; (2) a reduction of the anesthetized region to an immediate segment of the body; (3) a fall in blood pressure that is less than that caused by subarachnoid injection; (4) a rather constant absence of nausea and vomiting, which in contrast occurs more frequently in spinal anesthesia; (5) the incidence of postoperative lumbar puncture headache is less than one per cent, and (6) in cases in which the patients are very weak and debilitated there is a greater margin of safety than there is when spinal subarachnoid block is used. The disadvantages observed with this method have been failure to obtain adequate anesthesia in the proper region as a result of lack of proper technic or improper diffusion of the anesthetic solution. Furthermore, there is a delay in obtaining anesthesia which is not present in most cases in which subarachnoid injections are used. Peridural anesthesia is not, therefore, recommended as a substitute for spinal anesthesia but as an added procedure which is useful in certain selected cases.

INTRAVENOUS ANESTHESIA

The short acting soluble barbiturates, such as pentothal sodium and evipal soluble, are becoming more widely used for producing anesthesia for short operative procedures. The action is brief in contrast to the longer acting barbiturates, such as sodium amytal and pentobarbital sodium. When pentothal sodium and evipal soluble are used, the periods of induction and recovery are short and fair surgical relaxation is produced. The period of postoperative excitement, which is sometimes seen when the longer acting barbiturates are used, is noticeably absent when the newer type of preparations are used. Pentobarbital sodium and sodium amytal, however, are still of great value in the control of certain agitated psychoses or convulsive and manic states because of their more prolonged action.

The details of the administration of pentothal sodium have been described elsewhere[4], but, in general, it may be said that pentothal sodium, evipal soluble or any other short acting barbiturate should be administered intermittently and not according to body weight. Children who are less than twelve years of age, for the most part, do not tolerate the intravenous administration of barbiturates well because of respiratory depression. Likewise, certain adults who have dyspnea, due either to cardiac or pulmonary disease, do not react favorably to intravenous anesthesia. It is absolutely essential that a free airway be maintained in any case in which an intravenous anesthetic is administered, and it is wise to have a competent assistant hold the patient's jaw forward so that the tongue will not fall back into the pharynx and interfere with an easy to-and-fro exchange of air. Oxygen and carbon dioxide also should be readily available in the event that respiratory depression occurs.

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AIRWAY AND AIRWAYS IN RELATION TO GENERAL ANESTHESIA*

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The anesthetist is a full partner in a surgical team. Responsibilities other than technical are his. He should be equal to all emergencies, relieving the surgeon's mind so that he can devote his entire time to the surgical problem in hand, knowing that he will be kept posted, and that the needs of his patient will be cared for. In order to do this, the anesthetist should be kept posted as to the surgical procedure, so that he can know the relative depressing effects of such

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procedures, and be prepared to anticipate trouble.

There are technical difficulties connected with anesthesia, however, that must be met and overcome. This paper is concerning one of the principals of such difficulties.

One of the essentials to good anesthesia is the maintenance of a free airway. Probably no other one thing is as important in solving the problem of getting the patient under the influence of the anesthetic agent quickly and safely; of keeping the muscular efforts connected with respiration at a minimum, thus conserving the patient's energy; of preventing the expulsion of intestines because of the efforts associated with respiring through a partially obstructed airway; and of reducing the incidence of shock by being able to keep the anesthetic under better control and thus run a uniformly lighter anesthesia with satisfactory relaxation.

OBSTRUCTIONS TO AIRWAYS

Pathologic conditions that might be present *prior* to anesthesia that might lead to obstruction to the airway *during* anesthesia are: polypoid growths or other tumors of the naso-pharynx; hypertrophied turbinates; deviated septums; large adenoids and tonsils; hay fever; peritonsillar abscess; paralysis of a vocal cord; edema of the glottis; infections with swelling; foreign bodies; aneurysms; cellulitis; enlarged lymph nodes pressing against the larynx or trachea; large or retrosternal goiters; scars; infections in, or tumors of, the mediastinum; tumors of the tongue; ankylosis of the jaw; and tumors of the larynx.

Among those that come during anesthesia, either in normal cases, or in abnormal ones like those mentioned, are: falling back of the tongue, obstructing the pharynx; rigid jaw associated with the above; glottic or laryngeal spasm; falling down of the epiglottis, closing off the glottic opening; blood or mucus or stomach contents; loose dentures; foreign bodies, incidental to the operation, like pieces of tumor, adenoid, tonsil or teeth; misplaced forceps hanging across the trachea; a foreign body in the form of an improperly restrained nasal airway, put in by the anesthetist to relieve obstruction, that slips into the trachea.

Obstructions due to diseased conditions and deformities are best taken care of when the condition is diagnosed ahead of time, and adequate preparation made to take care of it.

There are several types of artificial airways at our disposal which, when properly placed, overcome obstructions of various kinds.

PREVENTIVE MEASURES

Marked nasal obstructions are circumvented by propping the mouth open before induction to prevent locking of the jaw in the early stage. As soon as the pharynx will permit, insert an oropharyngeal airway. This can be accomplished before induction by spraying the throat with 10 per cent cocaine, but this is not without some element of danger. Endotracheal maintenance is best if the operation is for the removal of the obstruction.

Trouble from large adenoids and tonsils can largely be avoided if sufficient basal is given to avoid excitement, gas induction with sufficient oxygen to avoid cyanosis, and the slow addition of ether if it is used. It is unfair to children (or to their parents) to submit them to the terrors of the operating room and hold them down while inducing anesthesia, when most of it can be avoided safely by proper premedication and gas induction. Endotracheal maintenance through a Magill tube is very satisfactory to the operator after he accustoms himself to the presence of the tube. It permits constant aspiration of the throat, if needed, and perfect relaxation in all cases. It also permits an all gas anesthesia, and, if cyclopropane is used, assures perfect oxygenation. This prevents engorgement of the tongue which is so often present in fleshy adults. This wide open airway prevents excessive strain on the heart, which is most important in some of these cases.

Where obstruction is due to pressure on the larynx or trachea from enlarged lymph nodes, new growths, thyroids or aneurysms, the introduction of an endotracheal tube as soon as possible relieves or prevents trouble. Spraying the throat with 10 per cent cocaine or 5 per cent butyn before induction, having the patient inhale on pressure of the spray bulb, shortens the interval before passage of the tube is possible. If the operation is of any length these

reflexes will return before they are needed. If the pressure is too great, causing a ribboning, or kinking, of the airway, it may be necessary to do a tracheotomy first. These cases are, fortunately, very rare.

Sometimes the tracheal rings have been absorbed from pressure, and yet the walls of the trachea are held apart by the growth. When the growth is removed the walls collapse. Under these conditions it is usually easy, under direct vision with the laryngoscope, quickly to pass a tube and hold the walls apart until the surgeon can suspend to the musculature.

ENDOTRACHEAL ANESTHESIA

For plastic work on the nose or its floor, lips, eyes, or any other part of the face or mouth, endotracheal maintenance gets the anesthetist out of the way, assures an excellent airway, and permits the movement of the patient's head by the surgeon at will. The same is true of brain surgery. This is especially important where the face is covered, and, should any obstruction develop, it would be hard to work without soiling or misplacing the sterile drapes, or interrupting the surgeon in his work.

In upper abdominal surgery, endotracheal maintenance is quite helpful, for it not only prevents an obstructed airway and helps to make the proper stage of anesthesia easy to maintain, but it makes it possible for the anesthetist to stop the patient's respiration while a difficult piece of work is being done by the surgeon,—work on the common duct for instance. This apnea is quite desirable sometimes, and can be done with safety.

For dental operations under gas, its administration through nasal tubes that extend into the oropharynx, is usually very satisfactory.

A pledget of cotton beside the tubes as they emerge from the nose prevents respiration around the tubes, and, if the tongue is packed back snugly and held in position with gauze, this method of maintenance is next in efficiency to, and in some ways has advantages over endotracheal. It is easy to place these tubes in position under nitrous oxide or ethylene, while the insertion of an endotracheal tube under these gases, without the addition of ether, or some other more potent agent, is not always successful. Clement and McCarthy, who are far from being novices in the use of nitrous oxide, report successful introduction of the tracheal tube without the use of ether in 46 per cent of the cases they tried over a period of 18 months. The percentage, in as skilled hands, would be higher under ethylene, but would still be quite short of 100 per cent. The attachment shown was made for us by the late McKesson, and has proved very satisfactory. It is designed for use with the McKesson machine, but can easily be adapted for use with other machines.

In thoracoplasties and pneumonectomies or lobectomies, we prefer endotracheal maintenance with the patient prone and on the edge of the table, the arm of the side to be operated on hanging over the side of the table to extend the clavicle. Slight Trendelenburg position tends to allow pus to flow out by gravity, and suction through the tube helps protect the other lung from contamination. Magill has designed a balloon plug for the large bronchus of the diseased lung which is effective in protecting the opposite lung. This balloon is placed in position under direct vision, and requires bronchoscopic skill. Waters has worked out a method of using a cuffed tube, designed by himself and Guedel, which both protects the good lung and gives an open airway.

When the patient is placed on the sound side, and an elevator used to extend the diseased side, and with the arm extended to increase the space between the clavicle and the spine over the latissimus dorsi muscle, the patient has a hard time getting enough oxygen to live on during the operation if only air is used as the vehicle. It really is quite hard on the patient if the operation is on the right side and the heart is compressed by the elevator.

LARYNGEAL SPASM

One of the most troublesome complications to be dealt with during anesthesia is laryngeal spasm. This is especially true with cyclopropane. Spasms are usually due to one or more of three things: forcing the anesthesia too fast with an irritating agent; starting the operation before anesthesia is sufficiently deep; or allowing the plane of anesthesia to rise to the point where reflex stimulation brings on the spasm. I have not a satisfactory explanation for the relatively high percentage of spasms un-

der cyclopropane. Probably it is due largely to technical errors. Some of my friends claim never to get them, so the fact that I do is a confession. Prevention is the best cure for spasms. A slow build up of sufficient tension before the incision is made; maintenance of a plane which will not allow the operative procedure to precipitate a reflex spasm; and anticipation of removal of packs in abdominal work, so that the plane of anesthesia can be lowered before the packs are removed, will reduce the incidence of spasms. Never attempt to pass an endotracheal tube under light anesthesia for it will usually precipitate a spasm. Hurry here usually means worry. A small continuous flow of cyclopropane as suggested by Burford will usually prevent the plane of anesthesia from rising during anesthesia. This takes the place of the gas absorbed by the fats of the body.

Since nitrous oxide and ethylene do not have a tendency to induce a spasm, induction with one of these gases and a gradual build up of the required cyclopropane tension is thought by some to prevent many spasms.

Taking every precaution we sometimes get a spasm, much to our disgust. Then there is the problem of what to do. If it is only partial, a crowing respiration being evident, sometimes a steady pressure on the rebreathing bag will overcome it and permit the stage of anesthesia to be deepened to the point where it will not recur. If, however, an attempt is made at this point to inflate the lungs by sudden forced positive pressure on the bag, it is disappointing to find that the spasm has increased and caused a complete obstruction. Attempts at respiration against a closed larynx, with the reserve oxygen soon used up and cyanosis becoming more marked each moment, are distressing. If the bag is cut out and oxygen forced, a little goes through, enough to keep the color good and to prevent the participation of others of the surgical team and of the gallery, in the troubles of the anesthetist. An endotracheal tube is wished for, but its passage is not practical because the opening through which it should go is closed. The exposure of the larynx with the laryngoscope and a tube ready to insert at the first sign of relaxation, will make its passage possible. The wait is most distressing to all present. If the patient is in good condition, little damage will be done, but with a diseased myocardium the strain might be too much. I know of one such case where the surgeon was going to do a cardiolysis in the hope of relieving a distressed heart. The patient died before the spasm relaxed. When the spasm is once broken, quite often the anesthesia can proceed to a deeper plane without further interruption. The only 100 per cent satisfactory dealing to have with spasms is to prevent them.

DISCUSSION

Dr. Neal Owens (New Orleans): I would like to express my appreciation to Dr. Caine for his excellent paper and for making available to us this type of anesthesia. I am referring particularly to the anesthesia administered through the intratracheal tube used in association with the Water's cap. This anesthesia has been a boon to oral surgery and to intranasal surgery. It is invaluable in operations for hairlips, cleft palates, and intra-oral lesions, in contrast to the confusion resulting from anesthesia given by the older methods. In administering this type of anesthesia the intratracheal tube is inserted and by means of an attachment inserted in the tube, it is brought out at the angle of the mouth in such a manner that the complete apparatus is carried out of the operative field and thereby causing no interference with the surgeon for the anesthetist is completely out of the way.

There are factors which everyone has to consider in doing operations for cleft palate or hairlip on babies: First, that there be as little anoxemia as possible; second, that no blood or foreign material be aspirated into the lung; and also as little blood as possible be swallowed or carried into the stomach. By intratracheal anesthesia, all these factors can be satisfactorily managed. The trachea may be blocked by the intratracheal tube, and the pharynx may be packed so that no blood reaches the stomach, and following this an anesthesia may be administered with the least possible amount of anoxemia.

The same technic applies to the intra-oral cases where the same factors are concerned.

Dr. Alton Ochsner (New Orleans): I would like to discuss Dr. Caine's paper from the standpoint of the general surgeon and then from that of the thoracic surgeon.

Intratracheal anesthesia, as presented by Dr. Caine, is a great thing for the abdominal surgeon, because it permits carrying out the operative procedure with very little difficulty. Anyone attempting to close an abdomen when the patient is straining, knows what the difficulties are. Many times this is not due to lack of anesthesia, but is due to a respiratory obstruction, and by introducing an

intratracheal tube, as described by Dr. Caine, it is possible to close the abdomen without difficulty.

From the standpoint of the thoracic surgeon the intratracheal tube is not only desirable, but also a necessity, unless one operates in a negative chamber or uses some sort of positive pressure. With the use of Water's method as described, one can safely operate on the diseased lung.

The production of apnea as discussed by Dr. Caine is especially desirable in operating upon diaphragmatic hernias. Instead of having a moving diaphragm, which is difficult to suture, one can easily suture the immobile membrane. The same is true in cases in which total gastrectomy is done. The anesthetist can produce apnea and greatly facilitate the operation for the surgeon.

Another type of case in which the intratracheal anesthesia is of great value is in thyroid disease, particularly in the individual with a large goiter in which weakening of the tracheal rings may result in tracheal collapse unless prevented by the introduction of a tracheal cannula prior to operation.

Dr. D. R. Womack (New Orleans): Dr. Caine introduced intratracheal anesthesia to me some few years ago and I have been grateful to him ever since. The method has met with opposition and often with complaints from the surgeon—some of these will be answered.

Above all, the safety of the patient is of prime importance. Intratracheal anesthesia offers the best possible control of the patient's respiratory system and gives the safest and quickest opportunity for resuscitation should it become necessary. A second safety factor is the closure of the larynx to foreign bodies and secretions. This closure is often not complete but is of definite value as I have demonstrated with the bronchoscope. I have bronchoscoped patients following tonsillectomy and nearly always found blood and secretions extending past the bifurcation of the trachea. A second series in which the tracheal tube was used were bronchoscoped and the amount of this blood and secretion encountered was much less.

A word about the introduction of the tube. Laryngospasm is the greatest difficulty. This can be avoided in large part, first, by a slow gradual induction of the anesthetic and second, by gentle manipulation. The larynx and subglottic tissues react with spasm to any manipulation. If the larynx is exposed and the tube inserted on the first attempt usually there is a minimum of spasm. If, on the other hand, there are repeated attempts at introduction, the laryngeal musculature is usually thrown into a spastic contraction for varying lengths of time. If this length of time is very great, the patient will become very cyanotic to the discomfiture of the entire operative staff. It is the common mistake of the unskilled in the use of the laryngoscope to attempt to use the upper incisor teeth or alveolar process as a fulcrum to visualize the larynx. If, instead of this method, the tip of the laryngeal spatula is constantly kept in mind and the thought of lifting the epiglottis with it is uppermost in the mind of the operator, better results will be obtained with much less effort. An added thought is to lift gently on the top just as the intratracheal tube is introduced. I believe the direct introduction under vision is more preferable than the blind "stabbing" method. If the tube is introduced under vision there is no danger of carrying foreign bodies (such as pieces of adenoid or secretions) into the larynx. Some observers have feared the carrying down of particles of tissue and other objects with blind nasal introduction. It is a matter of no importance whether tube is inserted through mouth or nose.

Once in situ the intratracheal tube should be completely ignored. In throat work it has often been mentioned that the tube hinders the free use of instruments for various procedures. I have removed tonsils, adenoids, and manipulated mandibles by many varying methods and find the tube to be more a mental than a physical hazard. This statement also applies to the removal of adenoids either by curette or adenotome, when the tracheal tube is introduced through the nose.

In esophogoscopy, the safety factor of an intratracheal tube is so great as to cause the careful operator to use it routinely. The sudden respiratory failure of an esophogoscopy can be a dangerous and alarming thing. The literature contains numerous cautions of this failure with advice to remove immediately the esophoscope. It is much easier to use an intratracheal tube from the start and avoid the terrifying experience.

Following the operative procedure it is always my custom to remove the tube with the suction attached to the proximal end.

Dr. Caine and his staff are to be congratulated on their excellent results with intratracheal anesthesia and I know I have come to rely on it so much that I am uncomfortable until the tube is in place. As Dr. Caine suggested, the method is now practically universally used by the better anesthetists and I feel that it cannot too strongly receive the endorsement of the surgeon.

THE INCIDENCE OF CONGENITAL HEART DISEASE IN THE CHARITY HOSPITAL OF NEW ORLEANS*

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The incidence of congenital heart disease as reported by various writers[1,12] ranges from 0.1 per cent to 2.5 per cent or more. It will be recognized that many factors influence statistics on this condition. Firstly, the "proportion" may be expressed variously, referring to the number of cases of congenital heart disease in terms of total autopsies, death or admissions, or to the incidence of congenital cases among those diagnosed or dying of "organic heart disease." Secondly, there is variation depending upon the age composition of the groups from which the data are obtained, as instanced by Philpott's[6] report of findings in routine autopsies: 0.3 per cent in subjects over two years of age and 4.7 per cent in neo-natal cases. Thirdly, there is the influence of the degree of interest in this subject among different clinicians and pathologists. Fourthly, many case histories will be lost in some record systems, because congenital heart disease is often only the underlying or predisposing cause of death; thus the record may be filed in such cases under an "immediate" cause of death such as bronchopneumonia, paradoxical embolism or endocarditis lenta.

This paper reports the analysis of the annual reports, for the decade 1927-36, from the record room, the pathology department and the heart station in a large southern general hospital admitting all types of disease and all ages of patients.‡ Only types of congenital heart disease of major clinical importance were included in the original records; minor types appear to have been omitted, although no doubt they did occur. Due to the stimulation of Dr. Maude E. Abbott[12], similar investigations are being pursued in many parts of the country, from which there may result a really trustworthy estimation of the actual incidence of congenital heart disease.

TABLE I.

Admissions	472,519
Deaths	27,077
Organic heart disease	15,317
Deaths from organic heart disease	3,879
Congenital heart disease	107
Deaths from congenital heart disease	42

From Table I it may be seen that 5.7 per cent of all patients admitted during the decade died in the hospital, and that the mortality among patients with organic heart disease was 25.3 per cent. There were 107 patients with a clinical diagnosis of congenital heart disease, and forty-two deaths were due to the condition. The serious prognosis of congenital cardiac disease is indicated by this hospital mortality rate of 39.2 per cent.

TABLE II.

Incidence of	Per Cent
Deaths with congenital heart disease	
In organic heart disease group	1.08
In all admissions	0.009
Clinical diagnosis of congenital heart disease	
In organic heart disease group	0.7
In all admissions	0.023

As shown in Table II, congenital heart disease was found at autopsy in 1.08 per cent of the cases dying with organic heart disease, that is, in one of every 92 such deaths. The clinical incidence (0.7 per cent) was slightly lower, for a clinical diagnosis of congenital heart disease was made in one of every 143 patients diagnosed during life as having organic heart disease. The very low frequency with which congenital heart disease is encountered in the general hospital population has not been mentioned in the literature consulted. In the present study it was found that only one in every 4,400 hospital admissions (or 0.023 per cent) had congenital heart disease recognized clinically, while death with the condition occurred only once in every 11,000 hospital admissions (or 0.009 per cent.)

Separation of the data for the two five-year periods making up the decade demonstrated a

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most unexpected increase in the frequency of both clinical and postmortem diagnosis since January, 1932. In the first half of the decade, 15 cases were diagnosed clinically and five after death. In the second half, 92 cases were recognized during life and 37 postmortem. This signifies that since the end of the first period there was an increase of 514 per cent in the number of clinical diagnoses of congenital heart disease, and an increase of 640 per cent in the number of cases diagnosed after death. This large discrepancy obviously is not correlated with the growth of the institution or with an increase of organic heart disease; since the end of the first half-decade, the total number of hospital admissions increased by 116 per cent, the total number of deaths by only 11 per cent, the number of organic heart disease cases by 48 per cent, and the number of organic heart disease deaths by 38 per cent. As far as these data are acceptable, and it is recognized that all such studies are subject to more or less incompleteness, one is forced to the conclusion that during the five years since 1931 there was either an actual large increase of congenital heart cases or a great improvement in the interest or ability of both clinicians and pathologists in recognizing the condition. Either possibility is difficult to understand, although the latter alternative is most likely the explanation. A similar increase in the postmortem recognition of congenital heart disease has been reported by McGinn[11], who found an incidence of 0.6 per cent for the period 1895-1921 and of 1.2 per cent for the years 1921-1935.

During the thirty years since 1906, when all records were destroyed in a fire, the records for 126 individual patients have been filed under "Congenital Heart Disease" as the principal diagnosis. Although many of these available histories were partially incomplete (so as to reduce the available total to 118 cases), analysis revealed the interesting information shown in Table III. From this it is seen that the great majority of all the cases (or 83 per cent) were in the first two decades of life, and that there was almost equal distribution between the sexes and colors.

TABLE III.

Age	Cases
Newly born to 28 days	41
1 to 24 months	20
3 to 10 years	18
11 to 20 years	19
21 to 30 years	7
31 to 40 years	9
41 to 50 years	2
51 to 58 years	2

0 to 2 years	52%	83%
3 to 20 years	31%	

Race	Per Cent
White	58
Colored	42

Sex	Per Cent
Male	54
Female	46

Dyspnea was recorded in 63 per cent of all the cases; cyanosis in 52 per cent, peripheral edema in 17 per cent, clubbing in 9 per cent, precordial pain in 8 per cent and epistaxis in 2 per cent. Congestive heart failure was noted in 33 per cent. Systolic thrills were found in 31 cases, of which 18 were in the pulmonic region, three in the mitral, two in the aortic, two in the midsternal region, and six were unlocalized. Systolic murmurs were recorded 98 times, of which 36 were in the pulmonic area, 21 in the aortic, 20 in the mitral, 12 midsternal, and nine unlocalized. In one, the systolic murmur was transmitted all over the body. Diastolic thrills were detected in only two cases, both times in the pulmonic area. Diastolic murmurs were heard 32 times, of which 12 were over the pulmonic area, seven in the mitral, seven in the aortic, four midsternally and two were unlocalized. In 29 cases there were definite changes in the electrocardiograms indicative of various degrees of myocardial damage. Abnormalities in the cardiac outline were described on roentgen ray examination in 40 cases. A Wassermann test was recorded in only 11 instances, of which eight were positive and three negative. Of the 126 cases, 60 died, giving a mortality rate of 48 per cent during the thirty year period; this it will be noted is slightly higher than the mor-

tality rate for the ten-year period which was subject to more detailed analysis.

In many records, both clinical and pathologic, the diagnosis was simply "Congenital Heart Disease." In the others, the acceptable specific types were recorded, and these are listed in Table IV. Other findings of possible relation to the condition were discovered in the histories. The only two patients who showed extracardiac anomalies presented exstrophy of the bladder in one and vaginal atresia in the other. Three cases were markedly retarded mentally. Hydropic degeneration of the placenta was noticed once. Three cases were born

TABLE IV

Diagnosis	Cases
Patent foramen ovale	10
Absent interatrial septum	2
Patent ductus arteriosus	9
Interventricular septal defect	6
Pulmonary stenosis	4
Tetralogy of Fallot	3
Dextroposition of aorta	2
Coarctation of aorta	2
Constriction of aorta	1
Aortic atresia	1
Aortic valvular stenosis	1
Bicuspid aortic valve	1
Right aortic arch	1
Dextrocardia	1
Truncus arteriosus communis	1
Mitral stenosis	1
Tricuspid insufficiency	1
Coronary arteries arising from pulmonary artery	1
Transposition of aorta and pulmonary artery	1

prematurely, and one was two months overterm. In three cases, the patient belonged to a set of twins. One individual was the thirteenth child born in the family. The possible influence of heredity was shown twice; two of the patients were first cousins, and two others were mother and son. Both parents of one patient were deaf and dumb. The mother and father of one individual, and the mother of another, had been taking intensive antiluetic therapy during several months of the pregnancy. The most frequent complication of congenital heart disease was bronchopneumonia, being definitely diagnosed in 19 of the 126 cases. One case of patent foramen ovale died as a result of paradoxical brain abscess.

CONCLUSIONS

1. The records of the Charity Hospital in New Orleans, for the ten-year period 1927-1936, disclosed that of every 92 deaths attributed to "organic heart disease" one case presented heart disease of the congenital type, an incidence by this definition of 1.08 per cent. This is lower than is reported by some other writers, who analyzed data from pediatric clinics especially.

2. The extreme rarity of the condition as a clinical entity among "all hospital admissions" is emphasized, the incidence by this definition being only 0.023 per cent or 1:4,400. Only one death with congenital heart disease occurred in every 11,000 hospital admissions.

3. The mortality rate from congenital heart disease is high, being 39.2 per cent for the decade 1927-1936, or 48 per cent during the thirty year period 1906-1936.

4. There is some indication that the condition is being diagnosed more frequently in recent years than formerly.

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PREGNANCY IN ACTIVE SICKLE CELL ANEMIA

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AND
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NEW ORLEANS

The rarity of pregnancy in active sickle cell anemia warrants the report of an additional case. Lash[1] in 1934 was able to find this condition mentioned only twice in the literature and reported a new case. In 1936, Killingsworth and Wallace[2], in a study of sicklemia in the southwest, mentioned a patient with active sickle cell anemia in the fourth month of pregnancy. A follow-up report was not given. Sharp and Schleicher[3] in the same year reported a 25 year old negress with active disease followed through pregnancy. No sickling was found in the child until the fourth month.

CASE REPORT

A 23 year old negress was admitted to the Tulane Medical Service of the Charity Hospital on March 27, 1937, complaining of pain in the left axilla. On the previous day she was suddenly seized with pain in the left axillary region while lying down. The pain was aggravated by breathing. Dyspnea developed concomitantly, necessitating the use of two pillows for relief. There was no history of chills, fever, or upper respiratory tract infection. She stated she was approximately eight months pregnant. Since early pregnancy she had experienced ease of fatigue and vertigo. No pain, dyspnea, edema or gastro-enteric symptoms had been noted. Three years previously, in her first pregnancy, a similar group of symptoms had developed. Following delivery of a female child, the symptoms disappeared. A second pregnancy was uneventful. It terminated one and one-half years ago with the delivery of a living male child. In the interim she has been symptom free. The remainder of the history is irrelevant. The family history was unknown to the patient. The husband was normal and healthy. He was not available for hematologic studies.

Physical examination on admission disclosed a well developed, but poorly nourished negress of approximately the stated age. She rested comfortably upon a backrest and did not appear acutely ill. The blood pressure was 140/80; pulse 80; respiration 18; temperature 99.3°. The mucous membranes and palms of the hands showed marked pallor. The sclerae were greenish yellow in color. The pupillary reactions were normal. The nose and throat were clear. The tonsillar lymph nodes were slightly enlarged. The lungs were clear. The heart was not enlarged to physical examination. A soft blowing mitral systolic murmur was heard. The rhythm was regular.

Fig. 1—Sickling of Cells in Wet Preparation.

The abdomen was enlarged to the size of an eight months' pregnancy. The height of the fundus was 27 cm. with a vertex presentation. Fetal heart tones were 176 per minute. The liver and spleen were not palpable. There were no areas of tenderness. Pelvic examination showed measurements within normal range. A slight cystocele and rectocele were found. The extremities were normal.

Laboratory Findings: The urine was normal. Blood: hemoglobin 40 per cent; red cells 2.1 million; leukocytes 23,000 with 92 per cent neutrophiles and 8 per cent of small mononuclear lymphocytes. Red cells showed polychromatophilia, anisocytosis and poikilocytosis. There were many nucleated red blood cells. Immediate, extensive sickling (Fig. 1) was found in both wet and dry preparations. Icterus index was 15.

While in the hospital the temperature varied from 98.6° to 102.5° F., respiration 18 to 32 per

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minute and pulse 80 to 120 per minute. Within one week she became afebrile. Therapy consisted of iron and intramuscular liver. She left the hospital on April 4, 1937, and delivered a full term male child in her home on April 28, 1937. The puerperium was uneventful. Examination of the patient on June 8, 1937, disclosed no important changes in her general status. The blood at that time showed hemoglobin 45 per cent (Dare); red cells 2,670,000; leukocytes 10,000, with small mononuclears 46 per cent, neutrophiles 50 per cent and eosinophiles 4 per cent. Polychromatophilia, anisocytosis, poikilocytosis and nucleated red blood cells were found. Extensive immediate sickling was found in wet and dry preparations.

COMMENT

Such complete reports of the characteristics of sickle cell anemia as Steinberg's[4], Sydenstricker's[5] and others[6, 7] make a detailed discussion of the disease unnecessary. The cause of the disease remains obscure. It is familial and hereditary and is apparently transmitted according to the Mendelian law as a single unit dominant non-sex-linked characteristic, confined to the negro. The following classification of Brandau[8] is adequate:

I. Sickle cell trait (sicklemia): healthy persons with sickling in vitro.

II. Sickle cell anemia:

1. Latent: healthy persons who are subject to recurring periods of active sickle cell anemia.

2. Active.

a. Mild: slightly or moderately anemic patients with sickling *in vitro*, or both *in vivo* and *in vitro*.

b. Severe: patients with severe grades of anemia with sickling *in vivo* and *in vitro*.

Accurate data upon the effect of sicklemia, or the sickle cell trait, on pregnancy, are lacking. The high incidence of sicklemia in the negro population, five to seven per cent, would seem to indicate that gestation is little affected in these individuals. We have found no data to prove that transmission through the father is significantly more frequent than through the mother. Therefore, we cannot comment upon the effect of sicklemia alone upon the fertility of the female. Active sickle cell anemia, however, appears to have a definite effect upon the fertility of the female. This is evident from the rarity of cases similar to ours in the literature. Such patients seldom become pregnant, and if impregnated, they are not likely to reach term. In only two of the reported cases[1, 3] did the pregnancy result in a live, full-term baby. In both cases, sicklemia developed in the child. Our patient also reached term and delivered a live, full-term baby. Six weeks later, when examined for the first time, sicklemia was found in this child. Examination of the other two children from previous pregnancies revealed active sickle cell anemia.

In the reported cases, and in our patient, hematologic studies before impregnation are lacking. Whether or not pregnancy activated sicklemia can only be conjectured. Our patient, prior to her first pregnancy, was free from symptoms, and in the last trimester developed the same clinical picture as described in the present pregnancy. With delivery in both instances, the symptoms have subsided. However, she is now six weeks postpartum and still has hematologic evidence of active sickle cell anemia. Further observations on this phase of the disease are indicated.

The exact mechanism by which active sickle cell anemia causes sterility is not clear. There are apparently two possibilities. The disease itself may in some unknown manner affect the reproductive function, or the mere presence of anemia may be the sole and important factor. Anemia per se, as a cause of sterility and abortion is commonly known[9,10,11]. Meaker states that "anemia has a striking effect; even the milder grades produce considerable depressions of spermatogenesis and presumably also of oögenesis." In such a disease as sickle cell anemia which, because of unsatisfactory methods of treatment, may be present for long periods of time, even through the adolescent period into adult life, one would expect the effects of anemia upon the reproductive functions to be profound.

SUMMARY

A case is added to the very limited group of pregnancy in active sickle cell anemia. Labor terminated normally with a living child and an

uneventful puerperium. The child developed sicklemia and two children from previous pregnancies had active sickle cell anemia. The possibility of the activation of the disease by pregnancy and the effects of the disease upon fertility are discussed.

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DYER:
THE LEPER'S CHAMPION

No one in the United States of America has ever devoted himself so untiringly in behalf of the leper as the late Doctor Isadore Dyer, at one time Professor of Dermatology and Dean of the Medical Department of Tulane University.

"The Lazaretto at Carville is his monument." Unquestionably his labor brought it into existence and saw to its growth both by the state and national authorities. These unfortunates loved him, "The Father and Founder of the Institution."

Taken from the care of the unscrupulous and the worst pest houses, Doctor Dyer made it possible for a home and medical treatment, all in keeping with Christian principles, to be provided. The efforts in their behalf continued and Louisiana became host to the nation's lepers.

His difficulties were great. He wanted them near to him, in fact, near to the city and his University, where he and his professors could work as a unit. However, the people refused to have the lepers situated near the city and his ambition was shattered.

In time, he developed another plan, to have the National Government take over the responsibility that in reality belonged to them. He succeeded, but the height of his ambition has never been carried out—"the utilization of the nation's scientists in their behalf."

Dr. Dyer was the first on the continent to administer chaulmoogra oil to the lepers and, subsequent to its use, many of them were discharged from the Institution.

It would be becoming for his admirers and followers to join in commemorating his deeds.

—D.

THE SOCIAL SECURITY TAX

The entire profession of the state has been circularized from the headquarters of Region 10, which includes Louisiana, Texas and New Mexico, concerning the Social Security Act in general and more particularly as to how it applies to doctors who employ one or more individuals in the pursuit of their professional activities. It is this group of physicians who are more likely to neglect the obligatory features of this Act, rather than the doctors who have private sanitariums, hospitals and laboratories where a larger number of people are employed.

The Journal of the American Medical Association under date of July 24, in the Organization Section, printed a warning from the Bureau of Legal Medicine and Legislation stating that if doctors did not attend to this matter they would be liable to rather severe penalties. This article also details what the physi-

cian should do about the tax in reference to his salaried employees.

In spite of the information obtained in this circular sent out by the Regional Director and in spite of the warning of the American Medical Association, there are going to be a considerable number of physicians who, with the usual iatric carelessness about business affairs, will neglect to secure the proper forms which must be submitted to the Bureau of Internal Revenue and which also must be accompanied by the tax. The ordinary physician's tax is 1 per cent of the employee's pay. After deducting this 1 per cent from the wages the doctor becomes the custodian of federal funds and has to account for these monies. Doctors who are interested in sanitaria and hospitals and who have eight or more persons on their payroll must pay a tax as well as collecting a tax from the employees. The returns should have been filed before July 31 covering the first six months of the year. This notice is necessarily late in appearing but if the matter is attended to promptly there will probably be no penalties assessed. After the July return has been made, subsequent returns must be submitted at regular quarterly intervals.

The provisions of the Social Security Act have to do only with the technical employees of the physician. They do not apply to domestic service, nor do they apply to employees in organizations that are exclusively charitable, religious, educational or literary in character. Whether a chauffeur who occasionally drives the doctor on his rounds will be classified as being in domestic service or in professional service is a question which has not yet been answered.

It should not be forgotten that the tax is not only upon the actual money that is paid but if clothing or lodging, food and so on are part of the compensation for the services rendered, then the value of such must be determined and they become subject to tax. The same thing applies to commissions, bonuses and so on. It must not be forgotten that doctors who belong to corporations practicing medicine, as in some of the group clinics and who are paid salaries, are considered employees and they must be taxed and taxes must be paid for them if their salaries are not in excess of $3,000 a year.

Lastly, if by chance you have mislaid or lost the pamphlet that was sent to you or do not understand fully the provisions of the Social Security Act, additional information can be secured from the Social Security Board, Smith-Young Tower Bldg., San Antonio, Texas.

TREATMENT OF ANGINA PECTORIS

It is a very common complaint of clinicians that they are unable to do investigative work without adequate laboratory facilities. This is an allegation which cannot be substantiated. Many of the classic investigations in medicine have been done in the ward or clinic without elaborate laboratory equipment. Excellent clinical investigation, that is the investigation of a patient and the study of a patient's symptoms and signs, has been accomplished in the past and today is being done with accuracy and is informative. As a matter of fact up until the last comparatively few years practically all research was entirely clinical. The separation of various fevers, for example, in the past 150 years has been done almost entirely by clinicians. The recognition of important syndromes, such as Addison's disease or, in the case of angina pectoris about which a few words will be said subsequently, Heberden obtained his information entirely from the study of patients. One of the important methods of evaluating new drugs, or even the older preparations, is by study of their effect on a group of patients. Clinical research is by no means a thing of the past and in the future it should rank on a parity with laboratory investigation.

An excellent example of what can be accomplished by studying the patient may be observed in a recent publication of Riseman and Brown[1] in reference to the medicinal treatment of angina pectoris. These two young investigators selected a group of patients who had the classical symptoms of angina pectoris and studied the effect of various drugs on their symptoms. They employed objective as well as subjective measures. Objective evaluation of their therapeutic result was done through the medium of a standardized exercise tolerance test. The subjective response of the patient was judged by the number of attacks and

the severity of the attacks of angina, or of many untoward or unexpected symptoms. They found that distinct beneficial results were obtained by the drugs that have peripheral dilatory effect, best by glyceryl trinitrate, with erythrol tetranitrate considerably down the scale and sodium nitrite even more so. This is of some interest because other drugs than nitroglycerine have been advocated on the basis or assumption that their action would be very much more prolonged than it is with nitroglycerine. Aminophyllin, which has become an extremely popular drug in the treatment of angina pectoris, ranked high although there were considerable untoward effects noted by this form of medication. Other drugs which were employed, such as phenobarbital, digitalis, and potassium iodide are well down the scale of effectiveness.

Nitroglycerine, it might be said, best should be given in repeated small doses, one tenth of a milligram (1/500 gr.) seems to be as effective as larger doses but has to be taken every hour. Aminophyllin to be effective should be administered in doses of 0.2 grams (3 gr.)

A word might be said about aminophyllin which has been used since 1908 in the treatment of angina pectoris and coronary disease. Other purine derivatives since then have been introduced by pharmaceutical chemists endeavoring to improve the properties of aminophyllin. In a further study of the value of drugs in the treatment of angina pectoris Riseman and Brown[2] have tried to evaluate these various purine preparations. The details of their method will not be gone into but suffice it to say that they were essentially the same as recorded in the first paper. In this publication, in addition to determining the value of drugs by the methods recounted, they also studied the frequency of gastric distress after varying sized doses and the relative cost of 1000 doses of the different preparations. They write that the optimum dosage is usually the greatest amount to be given without causing uncomfortable gastric reactions. They found that this was less likely to occur with the sodium acetate preparations of theophyllin and theobromine. The next best was theophyllin calcium salicylate. Of all these preparations theobromine with sodium acetate in terms of cost of 1000 doses was by far the cheapest. These purine drugs which have been mentioned may be undoubtedly the best in the treatment of angina pectoris but whether or not they are the best in treatment of coronary disease is another question. Long continued dosage is necessary when coronary disease exists and it probably will have to be continued throughout the patient's life; it is quite possible a drug such as theobromine with calcium salicylate might be the most effective preparation to be taken over a long period of time. Another factor exists also in that the coronary dilator effect of these preparations varies. This likewise must be considered but probably, on the whole, it does not make a great deal of difference if the drug is administered continuously and regularly and is taken conscientiously for many months or years.

Two other facts should be stressed in regard to the information derived from these two clinical studies. One is that sedatives, while of value in the treatment of patients with angina, should not be combined with one of the purine drug preparations but the maximum effectual dose of each should be determined and then administered. This cannot be done when they are in combination. Lastly, potassium iodide is of little subjective or objective value in the treatment of angina pectoris.

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HOSPITAL STAFF TRANSACTIONS AND CLINICAL MEETINGS

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NEW ORLEANS

The scientific meeting of August, 1937, was called by Dr. James T. Nix, Director of the Graduate School. Doctors Amedee Granger and R. W. Cooper presented the following paper.

PREVENTION OF RADIATION SICKNESS
PRELIMINARY REPORT

Because of the too frequent occurrence of severe nausea and vomiting in patients following irradiation, radiologists have either had to discontinue treatment of these cases before the maximum dosage could be applied, or decrease the daily dosage before a sufficiently high saturation curve of effective roentgens could be reached to produce the desired effect on the tissue irradiated.

Various treatments have been used to prevent the occurrence of radiation sickness with varying degrees of success; but to date none has been found to be specific. Of the treatments previously tried liver extract and nembutal seem to have given the best results. The intramuscular administration of liver extract in 2 c.c. and occasionally 4 c.c. doses as advised by Dietel[1], Webster[9], and Young[10], has met with some success. In the latter's report of 30 cases so treated 54 per cent were completely relieved, 23 per cent were partially relieved and 23 per cent were relieved not at all.

The oral or rectal administration of pentabarbital sodium (nembutal) advanced by Richards[5], Peters[5], and Popp[4] has been somewhat more successful. Some patients develop a tolerance to the drug, and an occasional one has an idiosyncrasy to it. Trostler[6,7] has warned that some barbiturates caused an increased sensitivity of the skin to roentgen ray. He has reported three cases and Uhlman[8] one case in which moderate doses of roentgen ray after the ingestion of barbiturates (phenobarbital) by the patient were followed by intense skin reactions, (thought at first to be roentgen ray erythemas). Trostler[6,7] accounts for these skin reactions by pointing out that the use of barbiturates produces porphyrinuria and porphyrinemia which in turn produced an increased sensitivity of the patient's skin to roentgen ray. He advises against the routine use of barbituric acid derivatives in patients who are receiving roentgen ray therapy.

In a recent publication by Holmes[3] and Hunter, an outline of the treatment of roentgen sickness at the Massachusetts General Hospital has been given. They divide post-irradiation sickness into three classes:

"Toxic sickness" due to a rapid absorption of foreign protein caused by the breaking down of radiosensitive tissue which has received a too massive dose of radiation. The treatment is supportive and eliminative with a high fluid and glucose intake. By way of prevention, caution in the size of roentgen ray dosage is advised if the sensitivity of the tissue to be treated has not been determined.

"Psychic sickness", which occurs in nervous apprehensive patients, is best prevented by a change of treatment (radium); or by being treated in a different roentgen ray laboratory. Odors in the treatment room should be eliminated.

"True roentgen sickness" is characterized by temporary disfunction of the liver and is partly prevented by a high carbohydrate diet started several days prior to the beginning of roentgen ray therapy. In those cases prone to have severe reactions, continuous drip intravenous glucose and saline are used for 48 hours after treatment.

In October 1936, Friedman[2] and Drinker reported 24 cases in which radiation sickness was largely prevented by the use of a grounded wire mask respirator. Their experiments suggest that true roentgen sickness is caused by the breathing of ionized air at the same time that the patient is receiving roentgen ray treatment. Elimination of either one of these factors did not result in the production of roentgen sickness. The presence of both was necessary to produce it.

Since this was an entirely new approach to the subject we decided to try it on a series of cases. We have followed as nearly as possible the same technic as outlined by Friedman[2] and Drinker. The same commercial mask was used as described in their article both with and without the charcoal cartridge.

The mask consists of a soft rubber cup which covers the nose and mouth and is held in place by an elastic band around the head. The patient inhales through a charcoal cartridge and several thicknesses of fine mesh copper screening wire, which are well grounded, and exhales through a mouth valve.

The patients in our series were carefully selected. Only these apparently having true roentgen sickness were used in the experiment. Cases of psychic sickness were excluded. In order to more completely remove the psychic element, we decided not to tell the patients what the mask was expected to do. The curious ones were told that the apparatus was meant to ground and thus protect them from static electricity. They accepted this explanation without question.

The radiation factors used were as follows: 200KV. 8MA. 0.5MM. copper and 1MM. aluminum filter, 50CM. skin target distance, effective wave length 0.14 A°, intensity 33 r/min. in air.

RESULTS

Most of the patients volunteered the information that they no longer suffered from nausea and vomiting and were delighted that they were "getting used" to the treatments. Only one patient, No. 4, complained that the respirator was uncomfortable. She was dyspneic, but she continued to use it. Eight patients reported marked improvement after the first treatment with the respirator, the other two noticed some improvement after the first treatment, but marked improvement after the subsequent ones. No appreciable difference could be noticed in the efficiency of the respiration with or without the charcoal cartridge. Some patients complained that they could not breath as well through the charcoal cartridge as they could through the wire mesh alone.

In order to prove that the grounding of the wire mesh was necessary to prevent radiation sickness, the following experiment was tried: In three of the patients, No. 2, 3, 4, the ground wire was not connected during one treatment. This was done without the patient's knowledge, and they wore the respirator as previously. Without exception they all complained that they were nauseated and vomited after this particular treatment (two of the patients had very severe reactions.) Their daily dosage had been increased from 100r and 150r respectively to 330r after they began the use of the respirator, and was not decreased at that treatment when the ground wire was disconnected.

Of the ten patients upon whom the respirator was used, eight reported complete relief from nausea and vomiting; two were very much relieved and did not vomit, but admitted that they

RESULTS WITH RESPIRATOR

	Cases	Location and Lesion	Number of Treatments	Skin Area Treated Sq. cm.	Daily Dosage	Nausea	Vomiting	Results
1.	J. F.	Ca. breast with metastasis	10	154	330r	Yes	Yes	Complete relief
2.	C.P.	Ca. cervix	18	154	330r	Yes	Yes	Complete relief
3.	M. K.	Ca. cervix	12	154	330r	Yes	Yes	Complete relief
4.	R. G.	Ca. cervix	12	154	330r	Yes	Yes	No vomit. Little nausea
5.	R. R.	Ca. cervix advanced	8	314	350r	Yes	Yes	Complete relief
6.	P. A.	Ca. cervix advanced	8	314	350r	Yes	Yes	Complete relief
7.	L. V.	Ca. tongue neck	8	128	300r	Yes	No	Complete relief
8.	V. S.	Ca. breast pelvis sterilization	6	314	350r	Yes	No	Complete relief
9.	R. M.	Ca. breast preoperative	6	154	330r	Yes	No	Complete relief
10.	J. B.	Chr. myelogenous leukemia spleen	8	314	75r	Yes	Yes	No vomit. Little nausea

were slightly nauseated after treatment. While it is felt that this series is much too small to draw any definite conclusions as to the percentage of patients to be benefited by this method of prevention, we feel that the results thus far are very encouraging and warrant continuation of the use of the respirator on a larger series of patients.

We wish to express our thanks to Mr. V. Veillon, technician, who assisted in recording the reactions of the patients.

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LOUISIANA STATE MEDICAL SOCIETY NEWS

BI-PARISH MEDICAL SOCIETY

The Bi-Parish Medical Society held a meeting recently at the East Louisiana State Hospital. Dr. Richard W. Young of Baton Rouge read an excellent paper on "Artificial Pneumothorax." Dr. Young's paper was discussed freely and favorably by physicians present.

Dr. Young and Dr. Holt, also of Baton Rouge, were elected as honorary members of the society and Dr. Arthur Long of the East Louisiana State Hospital was elected to active membership.

The next meeting of the Society will be held at Dr. S. L. Shaw's log cabin lodge on the first Wednesday of October.

E. M. Toler, M. D., Sec.

TRI-PARISH MEDICAL SOCIETY

The regular meeting of the Tri-Parish Medical Society was held at Tallulah on August third. The following members were present: Drs. J. P. Davis, President, Wm. K. Evans, G. S. Hopkins, P. S. Parrino, B. C. Abernathy and William H. Hamley, Secretary-Treasurer, of East Carroll Parish; G. W. Gaines, E. O. Edgerton, H. S. Freeman, H. S. Provine, H. C. Sevier, A. T. Palmer and Lerhue Stevens of Madison Parish; E. D. Butler, F. A. LaCour and W. McG. Dollerhide of West Carroll Parish; J. Whitaker, T. P. Sparks and D. F. Davis of Tensas Parish. Drs. R. J. Talbot and W. L. Smith of Monroe; C. C. Thompson of Delhi; W. H. Parsons, Isadore Dyer and B. C. Bronson of Vicksburg, Mississippi, and J. A. Coleman of New Orleans were guests.

Dr. Ralph J. Talbot of Monroe presented a paper on "Respiratory Difficulties of the New Born." This paper was discussed by Drs. Gaines, Whitaker, Parsons, Dyer, Bronson and Talbot. Dr. W. L. Smith exhibited roentgen ray pictures in reference to the subject.

Dr. Isadore Dyer of Vicksburg presented an interesting paper on "Some Practical Points in Prenatal Care and Management of Prenatal Complications", which was discussed by Drs. Hamley, Talbot, Thompson and Dyer.

Dr. J. A. Coleman, representing the Bureau of Parish Health Administration of the State Board of Health, spoke on "Venereal Disease Control." This subject was discussed by Drs. Sparks, Thompson, Gaines, Whitaker, Palmer, Sevier, D. F. Davis, J. P. Davis, Freeman, Dollerhide, Hamley, Abernathy, Evans and LaCour.

William H. Hamley, M. D., Sec.

ORLEANS PARISH MEDICAL SOCIETY

It will be noted that no news of the transactions of the Orleans Parish Medical Society has been included in this issue of the Journal. This is due to the fact that the Society has been in summer vacation since the last meeting which was held on July 12, 1937.

NEWS ITEMS

Dr. Leon J. Menville addressed the South Mississippi Medical Association, which met in Hattiesburg, Mississippi, during the early part of June, on "Cancer of the Breast." In the latter part of June, he was a guest speaker at the Tennessee Valley Post-Graduate Assembly at Knoxville, Tennessee. His subject was "Irradiation Therapy of Cancer." In the early part of July,

he was a guest speaker of the Denver Radiological Club, Denver, Colorado. At this meeting, he spoke on "Diagnosis and Treatment of Bone Tumors" and "A Study of the Gastro-Intestinal Motor Phenomena." He was also a guest speaker at the American Society of X-Ray Technicians, Denver, Colorado, of which organization, he was made an Honorary Member.

A Fellowship in Medicine at a salary of about $1000 a year is available at one of the Eastern medical schools. Information relative to this may be had from the editor.

Surgeon Fortunat A. Troie has been relieved from duty at the U. S. Quarantine Station, Miami Beach, Fla., upon the arrival of Assistant Surgeon Paul T. Erickson, about August 10, 1937, and ordered to proceed to the U. S. Quarantine Station, New Orleans, La., upon the departure of Surgeon H. E. Trimble, where he will assume charge of the U. S. Quarantine Station at that place.

Assistant Surgeon Charles M. McGill has been relieved from duty, U. S. Quarantine Station, New Orleans (Algiers) La., effective July 27, 1937, and is to proceed to Savannah, Ga., for duty, Malaria Research Laboratory, in connection with Public Health Administration.

MEDICAL DEPARTMENT RESERVE, TRAINING COURSE

The ninth annual training course for Medical Department reservists of the Army and Navy will be held at the Mayo Foundation, Rochester, Minnesota, October 3 to 16, 1937.

This training course was first inaugurated by the Seventh Corps Area at the request of the Mayo Foundation to give training in military medicine to the young medical men connected with the foundation. Other reserve officers requested permission to enroll and to take advantage of the opportunity to attend the clinical presentations during the morning hours. Such permission was granted and attendance has become so increasingly popular that it is now necessary to limit enrollment.

The program will follow the plan of past years. The morning hours will be devoted entirely to professional work in special clinics and study groups. Officers in attendance may select the course they wish to follow from the wide variety of presentations offered. The afternoon and evening will be devoted to a medico-military program under the direction of the Surgeon of the Seventh Corps Area (Army) and the Surgeon of the Ninth Naval District (Navy).

This training is on an inactive duty status and is without expense to the government. Enrollment is open to all Army and Navy reservists of the Medical Departments in good standing. Applications should be submitted to the Surgeon of the Seventh Corps Area, Omaha, Nebraska, or to the Surgeon of the Ninth Naval District, Great Lakes, Illinois. Enrollment is limited to two hundred.

The Surgeons General of the Army and Navy have signified that they will attend and it is believed that the Surgeon General of the Public Health Service will also appear on the program.

SOUTHERN TUBERCULOSIS CONFERENCE

The Southern Tuberculosis Conference and the Southern Sanatorium Association will meet at the John Marshall Hotel, Richmond, Virginia, September 29-October 1. An excellent program has been provided in the medical section and the non-medical section. In the former is a group of representative essayists from many of the eastern and northern states, besides the southern states. New Orleans is represented on the program by Dr. Emile Naef who will speak on "Childhood Tuberculosis."

THE ASSOCIATION OF MILITARY SURGEONS

The Association of Military Surgeons of the United States will meet in Los Angeles, California, with headquarters at the Hotel Ambassador, on October 14-16, 1937. A most interesting program has been provided by the program committee for this, the forty-fifth annual convention of the organization.

THE ACADEMY OF PHYSICAL MEDICINE

The Fifteenth Annual Meeting of the Academy of Physical Medicine will be held at the Hotel Walton, Philadelphia, October 19-21, 1937.

The Academy, which is international in scope, will present a scientific program based on reports of the most recent research and practice of the various specialties. In addition to the lectures, demonstration clinics will be held at the Hospitals of the University of Pennsylvania, Jefferson Medical College and Temple University.

A copy of the program may be had by addressing: William D. McFee, M. D., 41 Bay State Road, Boston, Mass.

MEETING OF MISSISSIPPI VALLEY MEDICAL SOCIETY

The third annual meeting of the Mississippi Valley Medical Society will be held at Quincy, Illinois, September 29, 30 and October 1. A most ambitious program has been arranged consisting of 48 teachers and clinicians who will give over 60 lectures and demonstrations in the three day intensive session. The first day will be an All-St. Louis program with 18 clinicians on the pro-

gram; on the second day there will be groups from Rochester and Chicago; on the third day the speakers will come from a wide territory. An innovation this year will be two short courses of instruction, (4 hours each)—one on "Surgery of the Neck" by Dr Lindon Seed, Associate Professor of Surgery, University of Illinois College of Medicine, and another "Interpretation of Clinical Laboratory Findings" by Dr. M. Pinson Neal, Professor of Pathology, University of Missouri School of Medicine. At the annual banquet to be held on September 30, the speakers will be Dr. R. K. Packard, President, Illinois State Medical Society; Dr. D. S. Conley, President, Missouri State Medical Society, and Dean of the University of Missouri School of Medicine; Dr. E. M. Myers, President of the Iowa State Medical Society; and Rev. A. M. Schwitalla, Ph.D., Dean of St. Louis University School of Medicine. There will be large technical and scientific exhibits. A complimentary stag supper will be given on September 29. The meeting is open to all ethical physicians. A detailed program may be obtained from Dr. Harold Swanberg, Secretary, 209-224 W. C. U. Building, Quincy, Illinois.

LOUISIANA STATE BOARD OF HEALTH

The Louisiana State Board of Health is not receiving the full cooperation it should have from doctors and midwives of the state in the reporting of births and deaths, according to Dr. J. A. O'Hara, President, and as a result executives of the industrial world are obtaining a false impression of the state's health record.

"Vital statistics are the yardstick by which a state's health is measured," Dr. O'Hara declared, "and the first step taken by every industry before deciding on the location of a plant is to inquire into the birth and death rates to find the chances of successful development, which first and foremost depend on good health.

"No intelligent investor wants to adopt a state on the wrong side of the health column, and our figures are entirely out of line, because we can't get complete figures to present a proper picture of our true growth and health.

"The situation is so serious that the Federal government has asked the board to take drastic steps, immediately, to obtain more complete birth returns especially, and even to enforce a law which calls for prosecution of those who do not turn in necessary data within a reasonable time."

To assist the board in collating present records, the WPA has inaugurated a clerical project in conjunction with the Vital Statistics Bureau, under the direction of Dr. P. A. Kibbe. This will be begun within a few days. The state board will probably be compelled to contribute about $2500 to this project, at the request of Federal health authorities who are cooperating with state officials.

TO AMERICA'S SCHOOLS

Once more, during the coming fall, winter and spring, the Voices of Medicine will salute the people of America, with the toast "Your Health". This is the well-known title of the radio program of the American Medical Association and the National Broadcasting Company. The coming season will be the fifth; the first two years were devoted to health talks, and the last two seasons to dramatized health messages. This year, the salutation will be addressed particularly to the teachers and students in the Junior and Senior high schools, in the hope that the program will be helpful in illustrating, amplifying, and enriching the health teaching in those schools. The program will be on the air while schools are in session, so that the program may be utilized directly in the thousands of schools which now have or soon will have radio and public address systems reaching the class-rooms. Programs will be announced in advance in Hygeia, The Health Magazine. While the program is planned especially for high schools, it will not sacrifice the interest which it has held for listeners in the home. To teachers, students and stay-at-homes, the American Medical Association and the National Broadcasting Company will address their message of health education.

INFECTIOUS DISEASES IN LOUISIANA

Dr. J. A. O'Hara, Epidemiologist for the State of Louisiana, has furnished us with the weekly morbidity reports for the state, which contain the following summarized information: For the week ending July 17, there were 70 cases of pneumonia listed. This was followed by 48 cases of syphilis and malaria, 40 of pulmonary tuberculosis, 33 of gonorrhea, 24 of cancer, 22 of influenza, 17 of typhoid fever and 13 each of whooping cough and hookworm. For the week ending July 24, syphilis, as usual, led all reported diseases with 76 cases listed, followed by 56 of pneumonia, 44 of gonorrhea and malaria, 33 of typhoid fever, 32 of cancer, 24 of pulmonary tuberculosis and 21 of whooping cough. Other reported diseases were less than 10 in number and of the more unusual diseases there were 7 cases of poliomyelitis reported; 2 each from Caddo, Richland and West Carroll Parishes and 1 from Natchitoches. A case of typhus fever was reported from East Baton Rouge. Of the 33 cases of typhoid fever reported, 12 had their origin in West Carroll Parish and 6 in Richland. For the next week, ending July 31, the following

diseases were reported in double figures: 50 cases of syphilis, 39 of pneumonia, 37 of pulmonary tuberculosis, 35 of cancer, 33 of malaria, 31 of typhoid fever, 18 of gonorrhea, 16 of influenza and 15 of whooping cough. During this week there were 3 cases of tularemia listed and 3 of undulant fever. For the week ending August 7 there must have been a hookworm survey somewhere in the state for 76 such cases appeared in the records of the Bureau of Epidemiology. Of the diseases reported in double figures, there were 49 cases of syphilis, 44 of pneumonia, 31 of pulmonary tuberculosis, 24 each of gonorrhea and cancer, 23 of typhoid and 20 of whooping cough. Poliomyelitis was still appearing throughout the state, there being 7 cases listed with no parish having more than one except Union where 2 were reported.

HEALTH OF NEW ORLEANS

The Department of Commerce, Bureau of Census, reports that for the week ending July 17, there were 129 deaths in the city, divided 81 white and 48 negro. There were 17 deaths in children under 1 year of age. For the week ending July 24, there was a very small number of deaths reported, there being 65 deaths in the white population and 52 in the negro, making a total of 117. The infant mortality was the same as for the previous week. There was a very sharp increase in the number of deaths taking place in the week ending July 31, there being 160 this particular week. Of this number 91 were white and 69 negro. This large number of deaths is more remarkable in that only 9 occurred in children under 1 year of age. For the next week, ending August 7, there were 146 deaths reported; divided 89 white and 57 negro. There were 17 deaths among children under 1 year of age reported this week.

WOMAN'S AUXILIARY

Louisiana State Medical Society

President—Mrs. George D. Feldner, New Orleans.

President-Elect—Mrs. Frederick G. Ellis, Shreveport.

First Vice-President—Mrs. Joseph P. Brown, Monroe.

Second Vice-President—Mrs. Walter Moss, Lake Charles.

Third Vice-President—Mrs. Robert Bernhard, New Orleans.

Fourth Vice-President—Mrs. E. A. Campbell, Homer.

Recording Secretary—Mrs. William B. Heidorn, Shreveport.

Corresponding Secretary—Mrs. Aynaud F. Hebert, New Orleans.

Treasurer—Mrs. Cassius L. Peacock, New Orleans.

Parliamentarian—Mrs. John T. Crebbin, Shreveport.

CONVENTION NEWS

The fifteenth Annual Convention of the Woman's Auxiliary to the American Medical Association, was held in Atlantic City, the playground of America. Over twelve hundred fifty guests were registered and the sessions were exceptionally well attended in spite of the many outdoor attractions which beckoned to the visitors. After the usual routine procedures of opening the convention, reports were read by the officers and chairmen of committees.

It was interesting to note the progress made in the various projects undertaken by the national organization as a whole and the many personal contacts made by the national president.

Although the programs carried out by the State Auxiliaries were along the same lines, each one was adapted to the needs of its locality. Health education in some form was fostered in every Auxiliary; cancer education and eradication of tuberculosis and venereal diseases headed the list in this group. Scholarships and loan funds for medical students were maintained in several Auxiliaries. Money was contributed for relief of flood sufferers in localities where needed; children's wards in hospitals came in for their share of attention, books were contributed to hospital libraries, and health meetings were held in conjunction with civic organizations.

The report from Louisiana compared most favorably with those of other states, and showed activity in the projects undertaken during the past year.

Respectfully submitted,

Mrs. A. L. Levin,
New Orleans.

Thank you Mrs. Levin. Our Auxiliary members are going to enjoy reading your splendid report, and, with the following letter from Dr. Charles M. Horton, President, Louisiana State Medical Society, I am sure we shall feel like working more than ever.

Mrs. Lucian W. Alexander,
Chairman, Press and Publicity.

LETTER FROM DR. HORTON

I welcome the opportunity to give written expression of my views regarding the value of the Woman's Auxiliary. When this organization was first proposed and I was asked to assist in getting it started in the Third District, I opposed it, because I was unable to see any good to be accomplished by such an organization and this

opinion was practically unanimous throughout the district. I know now that this opposition existed because we could not visualize the possibilities of accomplishment of such an organization.

The Auxiliary has left its childhood behind and has grown into charming and attractive womanhood, rendering valuable assistance to the State Society. This is attested to by the fact that all of the past presidents with whom I have discussed the matter have been most enthusiastic in their expressions.

As I stated, in the talk I was privileged to make at the Auxiliary luncheon in Monroe, last April, if the organization had done nothing more than provide entertainment for the women visitors to the annual meetings, this alone would have more than justified its existence.

The wives of the doctors, knowing they will be entertained have been eager to attend the meetings and have established friendly contacts, which they are glad to renew from year to year. Believing as I do in the value of the lighter things of life and in getting all the real happiness one can out of life, I consider these friendships of inestimable value. Goodness knows, we see enough of tragedy in our ordinary professional life.

Above and beyond all this, however, the Woman's Auxiliary is building up a friendly public feeling toward the medical profession, is assisting in spreading the gospel of preventive medicine, and is aligning itself with other groups of women in combating chronic diseases which afflict the human race.

The program outlined by the president and her cabinet for the current year is most comprehensive and far reaching and has the hearty approval of the State Society.

My hat is off to the ladies for their past achievements and my best wishes are extended for the success of their future activities.

Cordially yours,
C. M. Horton, M. D., President,
Louisiana State Medical Society.

BOOK REVIEWS

Handbook of Orthopedic Surgery: By Alfred Rives Shands, Jr., B. A., M. D. St. Louis, C. V. Mosby Co., 1937. pp. 593, illus. Price $5.00.

This is a very excellent elementary work on orthopedics. It was written mainly for the guidance of the medical student, but it can just as profitably be used by the general practitioner. The material has been divided into twenty-four chapters, sixteen chapters being arranged according to anatomical region, seven according to pathology, and one for the introduction. All the illustrations are line drawings. This brings out the point illustrated in the text, but it gives a faulty impression when viewing original roentgen ray plates. The most valuable part of the book is the extensive and comprehensive bibliography appended. This is arranged according to the material covered in each chapter and covers fifty-eight pages.

G. C. Battaloba, M. D.

A Woman Surgeon: By Rosalie Slaughter Morton. New York, Frederick A. Stokes Co., 1937. pp. 399. Price $3.00.

The story of the life and work of Dr. Morton is vividly portrayed in "A Woman Surgeon." Evidence of the strong drive to accomplish her ambition to become a physician is apparent throughout. In spite of much opposition, first on the part of even her family, and in spite of the obstacles later encountered in the field of medicine,—or perhaps with the opposition and obstacles merely serving to intensify her ambition,—she achieves an outstanding position in her chosen field.

Personal recognition however was not in itself sufficient. There was the need on the part of this pioneer woman physician to so blaze the way that women coming with and after her might find their paths less arduous; might find that they were more readily accepted in this field and that their contributions were afforded the recognition they were worth.

"A Woman Surgeon" presents not only the picture of a dynamic personality but presents pictures portraying the sympathetic yet grim, relentless fight on disease; presents pictures setting forth the havoc of war, those of almost overwhelming struggles on the part of science against superstition, ignorance, poverty. Only a person with deep understanding, one recognizing and sympathizing with human frailties and strivings, could have accomplished what Dr. Morton accomplished. And only a person gifted in the ability to present simply yet feelingly these portrayals in word pictures could have given the book which Dr. Morton gives in "A Woman Surgeon."

M. P. H. Bowden, M. D.

Endocrinology, Clinical Application and Treatment: By August Werner, M. D., F. A. C. P. Philadelphia, Lea & Febiger, 1937. pp. 672. Price $8.50.

This is a complete, comprehensive, single vol-

ume dealing with every known gland of internal secretion, describing the anatomy and physiology of each in detail.

This volume is of special value to the general practitioner or specialist in that methods of diagnosis and classification of types are as simple as can be found in any text dealing with the endocrines. The therapy and results to be expected from the use of endocrine preparations are discussed and evaluated. Tests for the various endocrine secretions are described. Illustrations and charts are especially noteworthy.

The volume should be in every practitioner's library.

CONRAD G. COLLINS, M. D.

Textbook of Medicine: Edited by J. J. Conybeare, M. C., M. D., Oxon., F.R.C.P., 3rd edition. Baltimore, Wm. Wood and Co., 1936. pp. 1027, including index, 24 illus. Price $7.00.

The text is aimed to meet the demands of the student and practitioner within as small a "compass" and at as low a price as possible.

The arrangement follows the usual classification of diseases according to the anatomical system chiefly involved. There are separate brief sections dealing with infectious, tropical, venereal and parasitic diseases. In addition, there are chapters on diseases of infants, diseases due to physical agents, poisons and intoxications, and a unique section on common skin disorders.

A considerable amount of repetition is present because of the jumbled arrangement and all in spite of the editor's honest attempt to avoid this undesirable element.

Symptomatology is adequately treated and supported frequently enough by explanations of altered structure and function in the light of modern advances. On the whole, therapy receives the brunt of omission.

Aimed at meeting the practitioner's demands, it is rather surprising to find twice as much space (200 pp.) given to disease of the nervous system as is allotted to cardiovascular and respiratory disease combined (148 pp.).

There is need for elimination of "hang-overs" from a by-gone era. For example, we are still led to believe that alcohol causes arteriosclerosis, disease of the myocardium and chronic nephritis, that tobacco is responsible for extrasystoles, and that high vegetable portion of diabetic diet is responsible for xanthoma diabeticorum.

It is the writer's frank opinion that the average student and practitioner should be able and willing to make a rewarded sacrifice of a few more dollars for one of the more complete medical texts at present available.

R. H. BAYLEY, M. D.

Life and Death: By Andrea Majocci, M. D. New York, Knight Publications, 1937. pp. 300. Price $3.25.

An autobiography usually is interesting. An autobiography of a distinguished surgeon is bound to give pleasure to a considerable group of medical readers, but also it should interest any one who is thrilled by a life of accomplishment.

Dr. Majocci began life tragically; his father died when he was a young child as a result of autopsy septicemia and the boy was thrown very largely on his own in order to obtain the desire of his life, a medical education. The first goodly part of the book has to do with his efforts to bring about this ambition. Really it is the most interesting portion, recounting as it does a truly personal account of accomplishment. The last half of the book is somewhat more philosophical and presents the man's mature impressions about medical, social, financial, marital, martial and other problems.

It is of interest to comment on some of the features of the book which are somewhat unusual. In the first place it is translated in rather a stilted, precise style and yet apparently the translator, appreciating that such is the case, descends at times to very ordinary slang: The use, for example, of the terms two-timing and out of luck. He speaks of an abortion as a charming job; he mentions the condition of one of his patients as a hopeless mess. Terms such as these hardly seem appropriate in a book of this character. Some of the medical terms used are, to say the least, unusual: a morbose process, a paralytic ileum, a neurosthenic, hematic fluid, cavitary wound and hepatic concretion. Some of the experiences that happened in the medical life of the author might well be looked upon with considerable skepticism. In one patient after pumping out the stomach he found the remains of eggs which had been eaten three months before and in this same patient found a month later that she had doubled the previous weight.

Dr. Majocci spent some months in America and did not care much for our customs, our habits and our ways of doing things. As an example, he compares the impersonality of some of our big institutions and clinics to the Baldwin Locomotive Works in Philadelphia, or the Chicago stockyards. He does say that American surgeons are extremely skillful. During his war experience in his early life, the author had the good fortune to know the present Pope, and Mussolini whom he saw repeatedly during his military experiences, and whose talents give rise to unbounded admiration in the author's mind when he was still but a young soldier and not the virtual ruler of a great people. Other names of distinguished individuals in civil, military and professional life

appear here and there throughout the book but these two, of course, are outstanding.

All of these criticisms are for the most part trivial. While at times certain features may jar slightly the sensibilities, at no time do they disturb sufficiently to disturb the interest in what is really a charming, stimulating and vivid presentation of the life of a real man.

J. H. Musser, M. D.

Vocational Rehabilitation and Workmen's Compensation: By Carl Norcross, Ph. D., New York City, Rehabilitation Clinic, 1936. pp. 126. Price $1.00.

This monograph consists of ten chapters and an appendix. These chapter cover: 1) Lump-sum settlements and their place in workmen's compensation; 2) General description of men receiving lump-sum settlements; 3) Physical condition of men following the settlement; 4) How lump-sums are spent.

Chapter nine, which treats of conclusions and recommendations, is particularly well written. The authors believe that early settlements should be effected in difficult cases, but they are decidedly against what is known as lump-sum settlements. Their investigation has proved that most of this money is squandered and that the workman is usually embittered and bankrupt within two years after such a settlement is made. The authors believe that weekly payments over a specified time is infinitely wiser.

Their studies prove that cases classed as neurotics are not helped as a rule by settlement. This is contrary to the usual belief. Physicians engaged in compensation practice frequently advise settlement of a case with the idea that the man will necessarily improve when he is no longer negotiating with the insurance carrier. This is true of malingerers, but not of neurotics, who, after the settlement, must find their own ways and means of receiving treatment.

Although the method of handling compensation cases differs in various states, this critical analysis of the expenditure of money received by injured workmen is of great interest not only to the physician engaged in this practice but to the insurance carriers as well. Both are working for the same end, to-wit: the re-establishment of all possible efficiency in a wage earner. There is no denying that the methods used to accomplish this are more advanced in other states than our own where we have no rehabilitation division. If this publication aids backward states in the building up of more efficient machinery it will have accomplished a beneficial service.

Edward A. Ficklen, M. D.

Pediatric Dietetics: By N. Thomas Saxl, M. D., F.A.C.P., F.A.A.P. Philadelphia, Lea & Febiger, 1937. pp. 565. Price $7.00.

"Pediatric Dietetics"—We could not wish for a better dietetics! All pediatric and practically all medical conditions are met. The book correlates digestion in infancy and childhood, a sound section on infant nutrition with the dietetic management of pediatric diseases and an appendix which includes height and weight tables, recipes, food classifications with caloric, vitamin and mineral tables. Numerous recipes and plans of several days food, instead of lists of allowed or restricted foods only, will help the pediatrician give excellent material to the patient. How pleased an anxious mother will be to get a week's diet instead of a list of allowed foods. All interested in the child's welfare will find this a very helpful guide.

Suzanne Schaefer, M. D.

Recent Advances in Orthopedic Surgery: By B. H. Burns, B. A., B. Ch., F.R.C.S., and V. H. Ellis, M. A. B. Ch., F.R.C.S. Philadelphia, P. Blakiston's Son & Co., Inc., 1937. pp. 296. Price $5.00.

This small volume is written for the man who has some knowledge of orthopedics. It attempts to cover the recent literature in orthopedics, mainly the European. The subject matter that is covered is done so in a very clear and concise manner. However, numerous very important conditions are not mentioned. A glaring omission is scoliosis. This book is well worth reading, and it is the reviewer's hopes that further editions will be soon forthcoming.

G. C. Battaglora, M. D.

Introduction to General Practice: By E. Kaye Le Fleming, M. A., M. D. Baltimore, William Wood, 1937. pp. 150. Price $2.00.

The author offers a measure of wise counsel for the young doctor planning to start private practice. Attention is called to the many imporant relations of the doctor to the patient, to his colleague, to the nurse, to the pharmacist, to the law as enacted in England, and to other environmental elements.

An eighteen-page chapter is devoted to national health insurance wherein the author goes on record as an enthusiastic advocate entirely convinced of the "ever-increasing success" of the plan.

Another chapter deals with contract practice and midwifery, closing with "all authorities are agreed that under proper conditions there is no place so safe for the mother to have her baby as in her own home." More interesting would have been some idea of the prevalence of "proper conditions" to justify the implication.

Aside from technical data that is of use only to one starting practice in Great Britain, there is much from which one may obtain a glimpse of the trend of thought and course of the British medical profession in response to modern social demands. The style is pleasing, straight forward and authoritative by one who holds the office of Chairman of the Council of the British Medical Association.

R. H. Bayley, M. D.

Child Guidance Clinics: By George S. Stevenson, M. D. London, Humphrey Milford; New York, Commonwealth Fund, 1934. pp. 186. Price $1.50.

This book should be read by teachers, social workers, judges and philanthropists as well as by members of the medical profession.

In a brief history of the Child Guidance Clinic, the author tells the need it sought to supply, how it was staffed, how financed, wherein it succeeded or failed. The Clinic as it exists to-day is described and its relationship to the child, the community and the practicing physician is discussed.

The psychiatrist and the pediatrician interested in mental hygiene will find this an objective and comprehensive evaluation of the Child Guidance Clinic.

Ina Harper, M. D.

Textbook of Applied Biochemistry: By Frank Wokes, B. Sc., Ph. C., F.I.C. Baltimore William Wood and Company, 1937. pp. 522. Price $5.00.

This is the first text applying biochemistry to pharmacy. It is an admirable text for students of pharmacy and public health. It is very clearly written and many parts of the text were criticized by outstanding English authorities in biochemistry and its closely allied fields. The topics include, Biochemical Importance of Water, pH., Surface Phenomena and Colloids, Spectroscopy, Ultraviolet Light, Carbohydrates, Fats, Proteins, Enzymes, Respiration, Bacteria, Hormones, and Vitamins. Physicians and medical students will be better served, however, by the standard texts in the field of biochemistry.

Howard H. Beard, Ph. D.

The Treatment of Diabetes Mellitus: By Elliott P. Joslin, M. D. (Harvard), M. A. (Yale), with the cooperation of Howard F. Root, M. D., Priscilla White, M. D., Alexander Marble, M. D. Sixth edition, Philadelphia, Lea and Febiger, 1937. pp. 707. Price $7.00.

This new edition of Joslin's classical work following within two years after the fifth edition finds its chief justification in the changes made necessary by the appearance of protamine insulin. As Joslin has repeatedly pointed out, the diabetic story is never complete and just when we think the end is approaching a new chapter is written. He and his associates are most enthusiastic about protamine insulin as a result of their experience with more than 1,000 patients treated with it. There are, however, a number of precautions to be observed in transferring a patient from regular insulin to protamine insulin. The reviewer, while sharing in the enthusiasm for protamine, would emphasize the difficulties in adjusting the dosage, difficulties which it seems to him are greater than with regular insulin. Practicularly, I would stress the value of Joslin's advice that the patient should keep in close touch with his doctor during the period of adjustment.

The chapter on protamine is not the only new thing in this sixth edition. Almost every page bears evidence of careful revision, editing and of the addition of new data. It is especially pleasing to note, through each successive edition, the progression toward liberal carbohydrates, simplification of diet calculations and of treatment in general.

It seems hardly necessary to repeat again what was said in reviews of previous editions: Joslin's book is one of the most authoritative texts in any field of medicine. It is truly the "Bible" for all students of diabetes.

I. I. Lemann, M. D.

Contributions to the Microscopic Anatomy of the Pancreas: By Paul Langerhans (Berlin, 1869). Reprint of the German original with an English Translation and an Introductory Essay by H. Morrison, M. D. Baltimore, The Johns Hopkins Press, 1937. pp. 39. Price $1.00.

This little thirty-nine page brochure of Langerhans' brilliant thesis should be welcomed enthusiastically by all interested in source material. We have here not only the original article in German and an adequate translation, but also a facsimile of the original title page, photographs of Langerhans at various epochs, a list of his publications and a stimulating essay by Dr. Morrison on Langerhans' life and work.

I. I. Lemann, M. D.

The Mind of Man: By Walter Bromberg, M. D. New York, Harper and Brothers, 1937. pp. 323. Price $3.50.

In a sequential way the author sets forth the development of psychotherapy. He proceeds with discrimination to pick out therapeutic principles here and there from methods in vogue at different times in the history of civilized man. If taken only at their face value, some of these principles are ridiculous, but when considered in retrospect in the light of present-day psychology, they

are seen to have been definite therapeutic advances. He reveals what the magian, the medicine man, the shaman, the exorcist, the monk, the priest, the faith-healer, the mesmerist, the hypnotist and the physician have contributed to the treatment of psychiatric disorder.

Among the contemporary schools of psychotherapy, the concepts of Freud, Adler and Jung are well handled. But the small space given to Meyerian formulations affords opportunity for the reader to form misconceptions as to their chronological position, and their developmental and therapeutic importance.

The reduction of present-day psychoanalytical procedures to practical and time-saving methods for clinic patients is interesting, especially in view of Burrows' work with groups, correctly referred to as "phyloanalysis".

In recognizing social psychiatry, the author does full justice to a field worthy of serious thought and practical work. No doubt its future development will contribute a great deal towards overcoming superstition and ignorance, and make society conscious of its contribution to and responsibility in many psychiatric disorders.

The author has given both professional and lay readers an interesting and instructive book. It is highly recommended for the modern therapist.

T. A. Waters, M. D.

Dietetics Simplified: By L. Jean Bogert, Ph. D., with a Laboratory Section by Mame T. Porter, M. A. New York, The Macmilliam Co., 1937. pp. 637. Price $3.00.

This interesting book is written in plain language which can be understood by persons with problems in diet, who have not a medical education. It presents in a clear, simple manner the essentials of dietary treatment, along with the reasons for using certain foods.

Sample diets are suggested along with complete directions for their preparation. From a medical standpoint, the section on therapy is well worth reading.

This book should be very helpful as a reference for both physician and hospital dieticians.

Henry Ogden, M. D.

The Development of Modern Medicine: By Richard H. Shryock. Philadelphia, University of Pennsylvania Press, 1936. pp. 442. Price $4.00.

The publication of a book concerning things medical with an historical background such as the present volume possesses, not written by a medical man, is rather a novelty. Most medical histories have been construed and constructed by members of the profession themselves. Such histories for the most part have to do with the individual physician and the result of the individual's contribution to medical science rather than the broader aspects of how present day medical practice developed as result of innumerable factors other than those that are solely medical. To write such a book would be an impossibility for a man who did not have a splendid historical grounding. It would seem, therefore, fitting that "the interpretation of the social and scientific factors involved" in the development of modern medicine should be handled by an historian. Shryock is Professor of History at Duke University and is eminently qualified to undertake what is undoubtedly a severe test of a man's broad knowledge. There can be no question as to the qualifications of the author, except possibly his cognizance of medicine, but a careful reading of the book resulted in finding extremely few errors so far as medical knowledge is concerned and showed the author has a surprisingly complete information concerning not only the broad aspects of medicine but also of many of the smaller details relating to the medical sciences.

The volume deals largely with trends and changes in medicine from the seventeenth century up to contemporary times. Shryock develops the thesis that from this early period until the present time medicine has waxed and waned in its influence on society as a whole and in its value to the individual. In the early days the physician was bound and hindered by inadequate training, by a lack of instruments of precision and by his dependence upon erroneous concepts and remarkably faulty theories. Then there gradually developed in the succeeding two hundred years a clearer concept of the modern science of medicine which advanced rapidly during the next fifty years, notably in the outstanding schools of Paris, beginning about 1800. There was then for some years a short slump in professional standards and accomplishments. The observations of scientists of the decades before were disregarded. The physician paid little attention to the social aspects of medicine. He became a polypharmacist prescribing nauseous mixtures on an empirical basis. This continued for thirty or forty years and then Pasteur, who had the happy faculty of being a great scientist who could interest the laity in medical sciences and who at the same time could be a leader in the medical world, revolutionized medicine. The schools of Germany attained a high scientific plane and gradually medicine became truly a science. As a result of these changes, which Shryock has sketched profoundly and deeply, the public has swung away from charlatans, quacks and practitioners of peculiar faiths, regained confidence in medicine and the medical man and nowadays, for the most part, has faith and trust in doctors and in their works. Shryock goes into considerable detail as to how

these changes took place. His account is stimulating and absorbing. Aside from the broad trends he develops, furthermore, the more detailed improvements, both scientific and sociologic, that have taken place in medicine in the last three hundred and fifty years. Child health, prenatal care, value of periodic health examination, the fight against mental diseases, the development of specialties, are all discussed in an enlightened and interesting vein. In the closing chapter he deals with some of the problems of the day, such as the cost of medical care, the control of venereal disease, the elimination of respiratory tract infections, the conquest of cancer, the lack of improvement in life expectancy in later age period; these are some of the problems which need solution in the future, the author writes.

A very brief resumé of the contents of this splendid volume has been presented to indicate the character of the work.It is undoubtedly authoritative, it is beautifully written and it is enthralling in its interest. The binding and format are excellent.

J. H. Musser, M. D.

Surgical Treatment: A Practical Treatise on the Therapy of Surgical Diseases: By James Peter Warbasse, M. D., F.A.C.S., and Calvin Mason Smyth, Jr., B. S., M. D., F.A.C.S. Philadelphia, W. B. Saunders Company, 1937. 3v. and index, 2486 illus. Price $35.00.

This treatise on surgical therapy first appeared in 1918, as the work of the senior author alone, and the second edition, which was written with the aid of the Assistant Professor of Surgery in the University of Pennsylvania Graduate School of Medicine, represents, according to its preface, "no significant departure from the general plan of the original work." The aim of the book, according to the 1918 foreword, is "to render help in every surgical condition under all circumstances." That is a gigantic undertaking even for a work in three volumes and more than 2500 pages, particularly when "surgical conditions" are interpreted to include the specialties of gynecology, urology, ophthalmology and otolaryngology, Only obstetrics seems to have been omitted, although at that many of its complications are included. It is inevitable, under the circumstances, that the discussion of all conditions is sketchy and superficial.

The senior author stated in the preface to the first edition that his purpose was to outline for each condition its ideal treatment, although the circumstances surrounding both the patient and the surgeon might make that treatment impossible of application. For that reason, alternatives of treatment were presented, which might be employed if the best thing could not be done. The next paragraph of that first preface suggests that these modifying circumstances are of two kinds, the surgeon's own inability to apply the so-called ideal treatment, plus the patient's inability,—presumably financial,—to demand it. The inescapable inference is that since the patient is likely to be treated according to the limitations of his medical attendant, provision is made from the outset for such "second-best" treatment. That is a state of affairs which is clearly anything but ideal.

Limitations of space, as we have said, make complete discussion of any subject impossible, and the method of therapy, and particularly the type of operation advised, is practically always, therefore, that preferred by the authors themselves. Their trend, it is true, is usually toward sound conservatism, but some curious and not altogether happy results follow. It seems odd, for instance, to find a composite operation (based on the union of fascia with fascia set down as the "ideal" operation for inguinal hernia, with Bassini's, Ferguson's and Halsted's operations dismissed in a sentence or two each. Again, the section devoted to toxic thyroid disease conveys no conception whatsoever of the risks inherent in the surgical treatment of that disease, and the same comment can fairly be made on the section devoted to intestinal obstruction.

The illustrations are excellent, and in the opinion of the reviewer are the best part of the book. This is frankly a work intended for the general practitioner, who has not the time, or, more accurately, the inclination, to use the larger systems or the special monographs. If it be considered only in that light, it has, perhaps, a field of usefulness. The practicing surgeon is not likely to find it helpful, nor are the practitioners of the various surgical specialties. In view of the enormous effort that went into the preparation of the book, and the proven abilities of the authors, it is to be hoped that when it is next revised its scope will be limited or its space increased; if that be done, many of the criticisms now fairly made against it immediately will be obviated.

Frederick Fitzherbert Boyce, M. D.

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